In This Issue—*The Elgin Road Race*

MOTOR AGE

Volume XXXVIII
Number 10

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CHICAGO, SEPTEMBER 2, 1920

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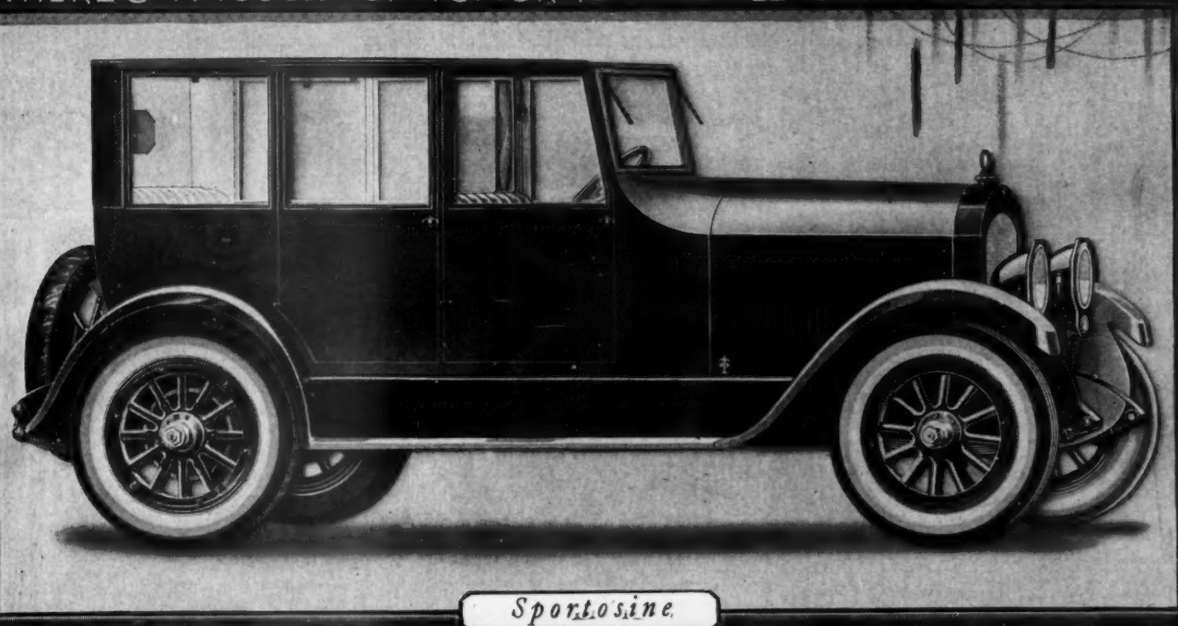

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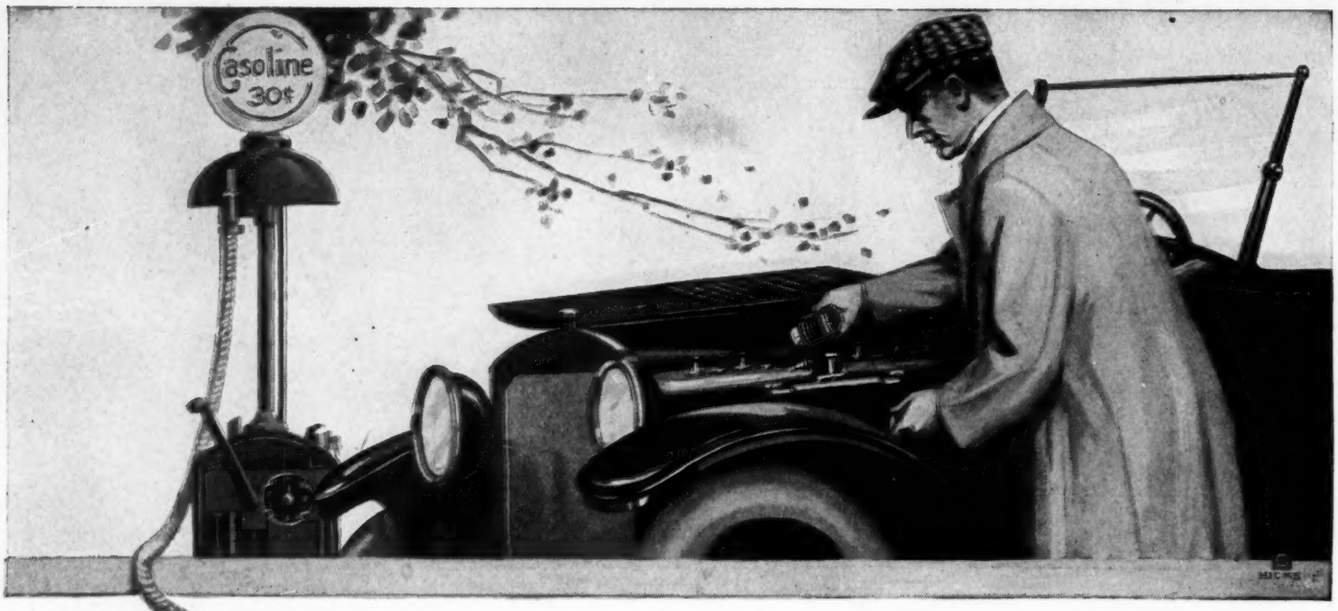

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Vol. XXXVIII, No. 10 CHICAGO, SEPTEMBER 2, 1920 $5.00 Per Year

MOTOR AGE

DePalma getting the checkered flag from starter Wagner

The victor's confident smile before the race

De Palma Wins Elgin Race

Breaks the Record for Course and Establishes New Mark for Lap—Big Achievement for 183 Cu. In. Engines

BY B. M. IKERT

ELGIN, Ill., August 28—The greatest road race in the history of racing came to a glorious finish to-day when Ralph DePalma tooled his eight-cylinder French Ballot over the finish line of the 250-mile eighth annual Elgin classic in the remarkable time of 3:09:54, an average speed of 79.5 m.p.h. In addition to winning the race, DePalma set a new record for the course and broke the lap record of 6:17 made in 1913 by Spencer Wishart with an engine of over 400 cu. in. displacement. DePalma made the race without a stop.

Close on the heels of DePalma was Tommy Milton in a Duesenberg, followed by his team-mate Jimmy Murphy in another Duesenberg. Mulford in a Monroe was fourth, O'Donnell in a Duesenberg fifth, Percy Ford in a Frontenac sixth, Alley in a Revere seventh and Gaston Chevrolet in another Monroe was the eighth man to finish, having lost much valuable time at the pits with a clogged fuel line.

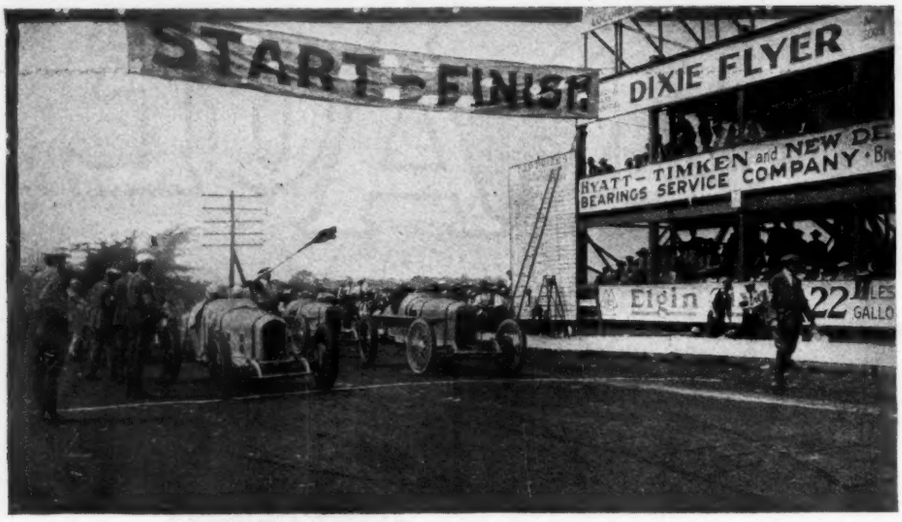
How They Finished

Driver	Car	Time
De Palma	Ballot	3:09:54
Milton	Duesenberg	3:11:01
Murphy	Duesenberg	3:12:47
Mulford	Monroe	3:12:59
O'Donnell	Duesenberg	3:16:35
Ford	Frontenac	3:24:14
Alley	Revere	3:33:03
Chevrolet	Monroe	3:43:57

From start to finish the four leading cars were never more than two minutes apart. In the fourth lap Mulford was only four seconds behind DePalma, which he cut down still more in the sixth lap when the Ballot was leading by three seconds. DePalma covered the first ten laps at the rate of 78.2 m.p.h.; equivalent to driving something like 85 miles in 64 minutes.

In his eleventh lap DePalma equalled the track record of 6:17, which he cut down to 6:10 in his last lap, a record which probably will stand for some time to come.

Ready for the Starting Bomb at Elgin



How they lined up at the start, with the Ballot just getting under way

On his twenty-first lap DePalma went off the course, but with his usual clever driving was back on the road before the spectators hardly had time to realize what had happened.

In many ways the race was the most remarkable ever run. Every car which started finished. There were but two stops at the pits, both by Gaston Chevrolet, who early in the race was troubled with a choked gasoline line and stopped on his last lap for gasoline. Except for signalling the drivers the men in the pits might just as well have been viewing the race from the grandstand. There was nothing to do but watch the cars make the 8½-mile circuit with clocklike precision .

Race a Pleasing Surprise

Early in the week there had been predictions made that the race, owing to the small entry list—eight cars—would be a huge joke, because with the usual number of cars dropping out for various reasons, about three cars would be running at the finish. But the race was a surprise. Authorities conceded after the race that for masterly driving, speed, car performance and attendance it was the greatest dirt track event ever run.

The cars although fitted with smaller engines than those which previously raced at Elgin were faster and gave less trouble. It is a distinctive achievement when eight cars can be driven over what after all is but a country road at terrific speed throughout a 250-mile grind and do not have to change a single tire. What is still more remarkable is the fact that some of these tires have gone through previous races. The tires, for instance, on Milton's car went through the Tacoma race several weeks ago and after going through the Elgin event looked good for many miles more.

The lesson of the Elgin race—smaller engines driven at high speeds—is directly applicable, as all the lessons from racing have been, to the design of commercial automobiles. The engines used in to-day's race were but 6 per cent greater in piston displacement than that of the Ford engine, which fact would seem to indicate that before very long we might expect to see a gradual decrease in the size of engines for our passenger cars.

More Economical of Fuel

The small cars were more economical in fuel consumption and the fact that Chevrolet had to take on fuel was due principally because he lost much when the fuel line was being cleaned out.

Faster time was possible also because of the fact that many of the cars used front wheel brakes. It is a noticeable fact that the cars so equipped were well up in front during the race. The Ballot and Duesenbergs had front wheel brakes, which allowed to run up much closer to the turns before shutting off. Mulford made the statement after the race that had his car been fitted with front wheel brakes he would have finished better than fourth.

Race Handled Well

The race this year was handled in a splendid manner. To Charles P. Root, director of the race, much credit is due, as he not only had the course put in better shape than it ever has been, but saw to it that the race was confined exclusively to cars of 183 cu. in. displacement.

Owing to the small entry list there was some talk of allowing cars of larger piston displacement to run a parallel race with the small cars, in the hopes that this would offer more entertainment for the crowds. To this Director Root was strongly opposed, holding that the race was being run for the benefit of the 183-cu. in. class cars and with the cream of the racing talent represented, there was little use of adding more cars.

Timing Fast and Accurate

The timing this year was in the hands of Chester Ricker and Otis Porter of the Indianapolis Speedway Association and for once the Elgin race was run with no confusion as to the standing of the cars during and after the race. The timers gave out information almost faster than the newspaper men could take it down.

Elgin Winners to Date

Driver	Car	Time	M.P.H.
1910—305 MILES			
Mulford	Lozier	4:52:21	62:5
1911—305 MILES			
Zengel	National	4:35:39	66:45
1912—305 MILES			
De Palma	Mercedes	4:25:35	68:9
1913—301 MILES			
Anderson	Stutz	4:13:38	71:5
1914—301 MILES			
De Palma	Mercedes	4:06:18	73:53
1915—301 MILES			
Anderson	Stutz	3:54:25	77:25
1919—301 MILES			
Milton	Duesenberg	4:05:27	73:9
1920—250 MILES			
De Palma	Ballot	3:09:54	79:5

Time Chart of the Eighth Annual Elgin Road Race

CAR NO.	NAME of CAR	DRIVER	1 LAP	2 LAP	3 LAP	4 LAP	5 LAP	6 LAP	7 LAP	8 LAP	9 LAP	10 LAP	11 LAP	12 LAP	13 LAP	14 LAP	15
2	BALLOT SP.	K. DE PALMA	6 30:90	12 58:84	18 24:76	25 53:00	31 20:00	38 52:00	45 19:00	51 25:00	57 58:00	1 04 76	1 10 33	1 16 51	1 23 05	1 29 26	1 35
12	DUESENBERG SP.	J. MURPHY	6 49:02	13 22:91	19 47:00	26 29:00	32 58:00	39 26:00	45 52:00	52 17:00	58 41:00	1 05 03	1 11 26	1 17 50	1 24 15	1 30 40	1 37
18	DE VERE SP.	J. THOMAS - ALLEY	8 10:21	14 33:76	21 40:00	28 40:00	35 40:00	42 24:00	48 27:00	54 27:15	1 00 15	1 07 09	1 13 38	1 20 08	1 26 40	1 33 12	1 39
10	DUESENBERG SP.	T. MILTON	6 46:71	13 18:76	19 48:00	26 18:00	32 46:00	39 04:00	45 31:00	51 57:00	58 22:00	1 04 50	1 11 25	1 17 57	1 24 34	1 30 08	1 36
9	DUESENBERG SP.	E. O'DONNEL	6 39:80	13 18:76	19 48:00	26 15:00	32 44:00	39 22:00	45 51:00	52 23:00	58 55	1 05 27	1 11 55	1 18 23	1 24 53	1 31 18	1 37
5	MONROE SR.	O. CHEVROLET	6 53:14	36 18:00	43 17:00	50 08:00	56 40:00	1 03 17	1 09 58	1 16 33	1 23 28	1 30 05	1 36 39	1 43 13	1 49 32	1 56 31	2 03
8	FRONTENAC SP.	R. FORD	7 8:40	14 12:95	21 19:00	28 24:00	35 20:00	42 10:00	48 03:00	55 49:00	1 02 51	1 09 13	1 16 03	1 23 03	1 29 47	1 36 26	1 43
3	MONROE SP.	R. MULFORD	6 43:76	13 06:03	19 45:00	26 59:00	32 24:00	38 55:00	46 25:00	51 51:00	58 18:00	1 04 47	1 11 07	1 17 45	1 24 11	1 30 38	1 37

The success of this year's race is quite certain to mean a repetition of the event next year. More cars will be available and the drivers have new marks to go after.

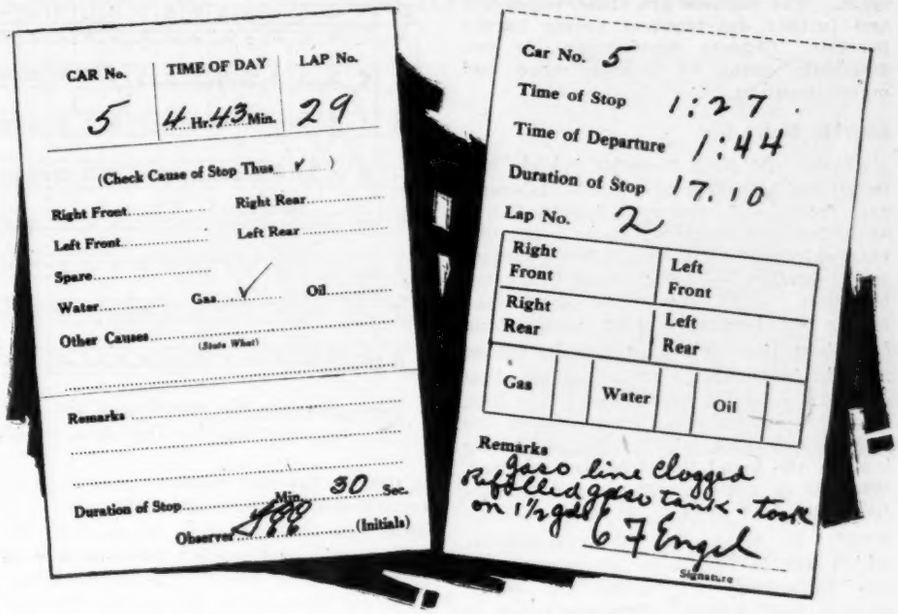
TRAINLOAD SHIPMENT POSSIBLE

Flint, Mich., Aug. 27—Pressure brought by the National Industrial Traffic League has resulted in suspension until Dec. 17 of the penalty for storage in open-top cars and for the storage of coal in either closed or open top cars. Automobile factories which receive inbound materials in single-car lots and ship outbound products in trainload lots are affected particularly and it was through the efforts of the Flint Chamber of Commerce corresponding with other chambers that the order was brought about.

MINNEAPOLIS SHOW DATES SET

Minneapolis, Aug. 27—The Minneapolis Automobile Trade Association has announced the dates of its two shows. The closed car show will be held in the Armory Oct. 5 to 9 inclusive, and the winter show Feb. 5 to 12, 1921, under the management of Walter R. Wilmot.

Pit Record of the Two Stops Made



Here is a reproduction of the technical committee's slips checking the two pit stops of Gaston Chevrolet. Last year there were twenty-nine pit stops

Small Engines Again Demonstrate Merit

CONSIDERED from the standpoint of mechanical reliability the Eighth Annual Elgin Road Race was the most remarkable performance ever witnessed on this or any other track. But one pit stop was made for trouble caused by a clogged gasoline line on Gaston Chevrolet's Monroe. This stop delayed the green car 17 min. and 10 sec. On the twenty-nineth lap, with but one lap to go, the same car made a second stop of 30 sec. duration, during which a gallon of gasoline was taken on. Other than these stops every car went through the race from start to finish without mechanical trouble, electrical difficulties, or other mishaps. Neither did any car stop for gasoline, water, oil, tires, or for instructions, with one exception, and here the human element entered and a driver was replaced. Joe Thomas who had suffered injuries during the practice trials was not physically able to withstand the severe grind, and Tom Alley took the wheel for him.

It falls to the lot of he who describes the features of the race to talk of the manner in which DePalma took the lead at the very beginning which he held continuously throughout the race for the full thirty laps. The means which enabled him to maintain his lead with such great regularity bears discerning interest. DePalma's lead which was never more than 2 min. and once reduced to 3 seconds was made possible primarily, of course, by efficient driving, but the foundation upon which the driving rested was the manner in which DePalma's pitmen kept him informed of his position.

DePalma's Pit Well Ordered

It has been often said that a race is won from the pits, and this was undoubtedly true to a large extent in yesterday's race. It is not possible for a driver to keep record of his position and the position of his opponents, which is the duty DePalma assigns to his pit manager, and by conveying this information by means of large letters on a blackboard to him as he passes he is enabled to gain a few seconds if his lead is alarmingly reduced.

This was the first road race to be run with the 183 in. engine. Five years ago an engine of over 400 cu. in. displacement driven by Spencer Wishart made a track record of 6 min. and 17 sec. which has successfully withstood the attacks of all drivers until the small engine reduced this to 6 min. and 9.7 sec. Considering the great difference in engine speeds between the larger engine of that time and the small engine of to-day, it illustrates the great strides which have been made in structural design.

Traversing 251 miles at better than 75 m.p.h. with the engine turning up at speeds well above 3000 r.p.m., and this on an average conditioned road, gives a comparative idea of the advances made in construction. Piston speeds in these engines are approaching rates at which it was thought only peripheral velocities of rotative members could attain. This year being the first in which the 183 cu. in. engine has been used, it is hardly to be

Showing the Lap Times of Every Car for the Thirty Laps

LAP	16 LAP	17 LAP	18 LAP	19 LAP	20 LAP	21 LAP	22 LAP	23 LAP	24 LAP	25 LAP	26 LAP	27 LAP	28 LAP	29 LAP	30 LAP
47	1 42 06	1 48 29	1 54 42	2 00 53	2 07 05	2 13 28	2 19 49	2 26 05	2 32 21	2 38 37	2 44 59	2 51 16	2 57 33	3 03 44	3 09 54
03	1 43 24	1 49 45	1 56 08	2 02 28	2 08 49	2 15 09	2 21 31	2 27 50	2 34 14	2 40 38	2 47 00	2 53 26	2 59 03	3 06 19	3 12 47
27	1 39 08	2 05 44	2 12 13	2 18 49	2 25 48	2 32 06	2 38 43	2 45 19	2 51 55	2 58 43	3 05 31	3 12 26	3 19 15	3 26 04	3 33 03
21	1 42 37	1 49 13	1 55 33	2 01 57	2 08 17	2 14 33	2 20 56	2 27 10	2 33 23	2 39 36	2 45 47	2 52 04	2 58 23	3 04 46	3 11 01
39	1 44 04	1 50 31	1 56 53	2 03 18	2 09 39	2 15 59	2 22 20	2 28 40	2 35 07	2 41 32	2 48 03	2 54 44	3 01 59	3 09 05	3 16 35
11	2 09 47	2 16 22	2 22 47	2 29 17	2 35 45	2 42 11	2 48 39	2 55 08	3 01 43	3 08 13	3 14 45	3 21 14	3 27 51	3 35 15	3 43 59
10	1 49 55	1 56 41	2 03 33	2 10 21	2 17 04	2 23 47	2 30 30	2 37 11	2 43 52	2 50 38	2 57 17	3 03 59	3 10 36	3 17 18	3 24 14
25	1 43 34	1 49 58	1 56 14	2 02 47	2 09 04	2 15 23	2 21 42	2 28 02	2 34 22	2 40 47	2 47 16	2 53 46	3 00 11	3 06 32	3 12 59

Q REV VOLT

expected that the development of these small engines has reached its ultimate stage. The engines are truly wonderful and further development seems hardly possible. Chassis development is undoubtedly going to receive more and more attention.

Shackle Holts Hot

Among the improvements which will result and be reflected in stock passenger cars from road racing of this kind will be spring construction, chassis balancing, rear axle construction and lastly but of great significance, front wheel brake application. At the conclusion of the race it was noted on several of the finishing cars that the oscillation on the spring shackle bolts had been so violent that the bolts were hot to the touch. In fact, they were warm when compared to the tire temperature which was extremely low for the grind the tires had endured. Whether or not we will see a departure from the leaf spring, it would be improper to state, but if developments which are taking place at present are any indication, we might see coiled springs held within telescopic tubes in general practice.

Better Balancing of Cars

Together with the spring development will come better balancing. It was noticed how many of the cars clung to the road at speeds around 80 mi. per hour. Bumps, hills, curves and other undulations in the road seemed to have no effect on the manner in which the cars rode. Every effort seemed to be transformed into forward motion. Side swaying was hardly perceptible. By applying lessons learned from such trials to our stock cars, the industry will make great progress.

Very noticeable was the difference in speeds maintained by those cars having four wheel brakes and those with brakes on the rear wheels only. Every car equipped with four wheel brakes had the decided edge on the others. In fact, the first three cars to finish had four wheel brakes. At present one American concern is completing its design for brakes of similar construction on stock cars. It has been proved that four wheel brake equipment enables a stop in less than half the distance as compared with rear wheel brake equipment.

May Bring 122 Cu. In. Engine

When the development of these small cars has approached the point where further increase in speed and efficiency seem to taper off to the part of the curve we may expect another reduction in engine size. This evolution will undoubtedly bring out the 2 Liter engine which has a piston displacement of only 122 in. As it is, the present engines are only 6 per cent larger in piston displacement than the Ford engine, but over 90 h.p. is developed.

As the engine size decreases the quality of workmanship must increase in order to produce efficient results.

Tires are also giving better service on these light cars. Much of the credit for the wonderful performance of the cars is due to the tire maker. It was quite remarkable to note after the race had been run, that the tires on all the cars were cool. Ordinarily, after a race of this kind on a rough road the tire temperature mounts up due to the internal friction in the tire. The more perfect bonds between the laminated layers of the tires is chiefly responsible for this better performance. Of course, the fact that the cars are lighter and better balanced contributes somewhat to the tire performance.

Spark Plug Problems Solved

Such little things as spark plugs, which were wont to be great offenders, but due to the knowledge that has been gleaned from the trials of racing, are now so constructed that they seldom give trouble.

In the summing up of the comparative progress that had been made by the automotive industry from the year 1919 to 1920, many noted authorities said that the industry's products were ever being bettered, which was a tribute to the contributions made by racing, the greatest experimental laboratory the industry has.

Standing of the Racers for Each Lap

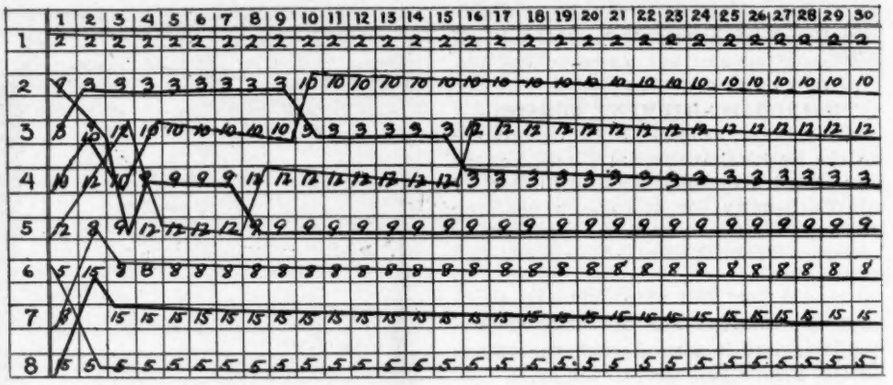


Chart showing the standing of the cars during the running of the race. Note the straight line for DePalma, which means he led the field all the way

Front wheel brake construction on the Ballot which made it possible for the victor to drive up to the turns much faster than cars not so fitted

In next week's issue of Motor Age will be published the equipment used on all the cars in the Elgin Road Race, together with additional scenes of this great history-making event.

Mulford Joins Paige Company In Pikes Peak Climb Contest

Detroit, Sept. 1—Ralph Mulford, famous race driver who has joined the Paige organization as a demonstrator of the new big six is enroute to Denver where he will make his debut with Paige at the hill climbing contest at Pikes Peak, Labor Day.

Mulford has participated in the most of the races at the Indianapolis Speedway since 1911. His best known victory was the first Elgin National Stock Chassis Championship in 1910. In 1908, 1909 and 1910 he won 24-hour races, each year driving a Lozier and bears the distinction of having won his first automobile race when as a team-mate of H. Michener, in 1907 he won a 24-hour race on the Point Breeze track in Philadelphia in a drenching rain.

He is possessed of natural engine ability and built several cars according to his own ideas and used engines of his own design in one or two instances.

DEALERS NEED NOT REGISTER

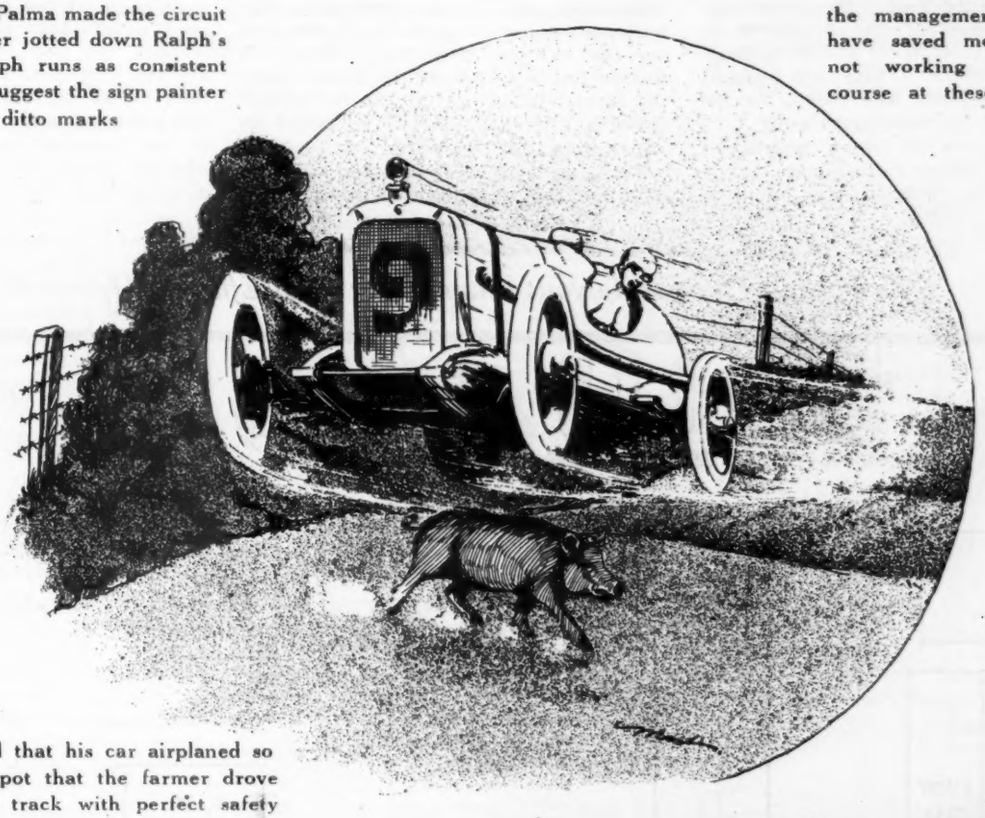
Boston, Aug. 28—The new law requiring that sales of automobiles by other than dealers or licensed tradesmen, be registered with the chief of police and the city registrar of motor vehicles has been put in force.

Around the Course at the Elgin Road Race

Every time DePalma made the circuit the sign painter jotted down Ralph's name. If Ralph runs as consistent next year we suggest the sign painter use ditto marks

Louis Chevrolet did not feel at home watching the race from the side-lines

The cars never did touch certain portions of the backstretch and the management could have saved money by not working on the course at these places



Eddie O'Donnell said that his car airplaned so beautifully at one spot that the farmer drove his pigs across the track with perfect safety

Percy Ford sprinkled dirt on the spectators who got to close to the fence at Hornbeek's turn

Here is one of the best pictures we could get of the winning Ballot car

Planning a Tire Service Station

Profits Depend Largely Upon How Well the Business Is Organized to Give Quick Service—Choosing the Right Equipment Important

IN LAYING out a tire service station the first thing to consider is getting the equipment suited to existing needs and to the kind of business available.

There is danger of stocking up with a line of equipment some of which is sparingly used, while on the other hand, there are some things very essential, which, owing to their initial cost, may seem unwarranted to those about to enter the field of tire repairing. The ideal equipment for one shop may not do for another in a different locality.

The size of the town has much to do with it. The tire service station in a city like Chicago will differ from one in a smaller town, and so on. However, it is well to bear in mind that the tire service station in the small town, potentially at least, has the business of the farmers in its community. We know of a case where a man runs a tire repair business in a town of 800 people. He operates a light service truck with which he is able to collect damaged tires from people living within a radius of fifteen miles and because of the small overhead does a good business.

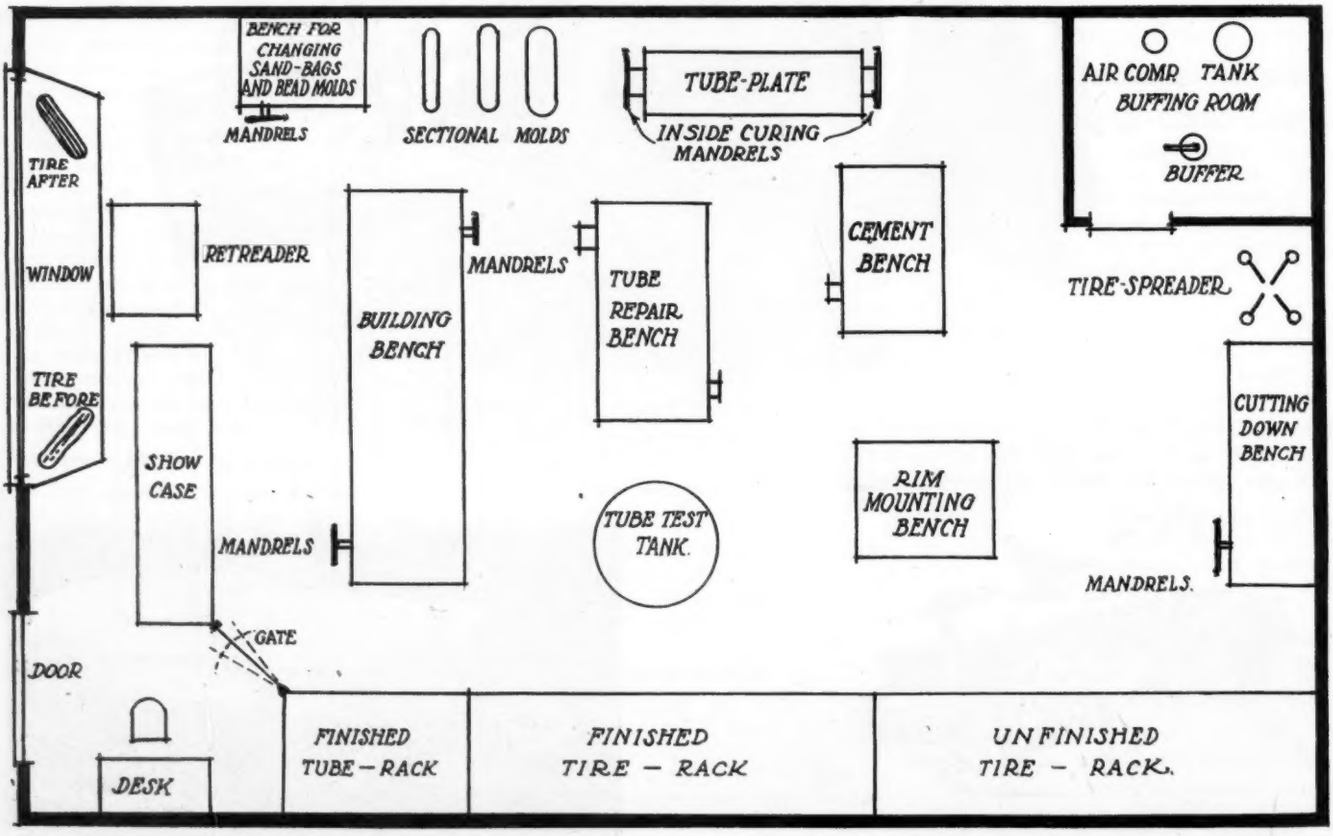
A STUDY of the accompanying floor plan will show that there is regular progression in the work. Thus, tires and tubes to be repaired are brought in at the rear by the service truck, or through the front entrance if they are brought in by the customer and stored in the rack provided for unfinished work.

From then on the work progresses logically, first to the cutting down bench and then to the buffing room, which it will be noted is partitioned off. The next work is done on the cementing bench, whereupon the tire is removed to the building-up table. Here it is prepared for the vulcanzing process. The vulcanizer in this case being placed near the front window. After the tire comes through the vulcanizer it is stored in the rack for finished work.

Many will probably wonder why we have put the vulcanizer or retreader in the window. To quote from a manufacturer of vulcanizing equipment:

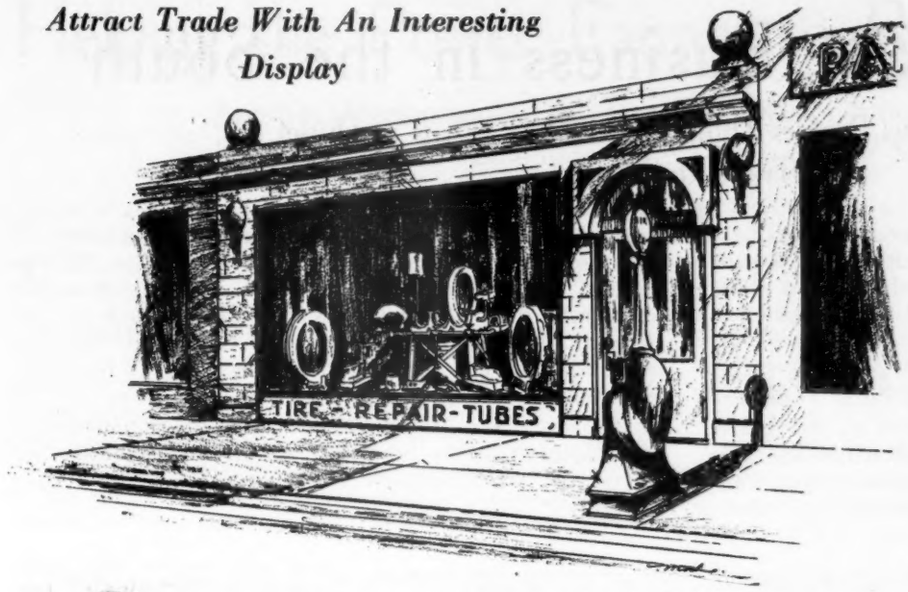
"We are of the opinion that this is a very novel idea; one that we actually worked out and found a big business success. In fact, it is the biggest business getter we have seen applied to a tire service station. It is not only worked in our city but in several other cities and we recall an installation in Philadelphia where at times the sidewalk in

Tire Service Station Layout Planned for Most Efficient Operation



This ground plan of a tire service station should approach very closely the ideal for a business. The arrangement of the apparatus is such that there is proper sequence to the various operations necessary in the handling of a tire or tube from the time it comes in to the time it is ready for the customer

Attract Trade With An Interesting Display



The show window of a tire service station can be made valuable by placing it in a vulcanizing machine, a "before and after vulcanizing" tire and several accessories. The aid dispensing device shown can be of the nickel-in-the-slot type or the free air variety

THIS article is the first of a series to run regularly in Motor Age dealing with service on tires. Each week an article of interest to the man running a tire service station will appear. The increasing number of cars and trucks on the market means more tires to keep in shape and in order that this branch of service work may be elevated to a higher plane we shall give to our readers one or two pages a week devoted to some subject in connection with tires that should help put more money into his pockets.

Profits from service work whether it be confined to tires, batteries, engines or any other units that go into modern automotive apparatus depend on how well a place is equipped and conducted. Tire service stations can be made just as inviting as some of the better class automobile service stations and run on a profit-making basis. The layout shown herewith primarily is intended for a tire service station in a town of about 5000 people. With modifications the layout can be adapted to most any size or shape of building.

front of the window was so crowded that it was necessary for the passers-by to walk out into the street to get past the store.

"People seem exceptionally anxious to have an opportunity to see tire repairing actually done, and it is interesting to observe the interest the novice takes in a tire that is to be retreaded on account of the fact that it is possible to take a tire that to the inexperienced eye, is apparently completely worn out and rebuild it with a finish resembling a new tire.

Getting Advertising Cheaply

"We are positive that there is no cheaper advertising to be had than by putting equipment in the window and giving the possible customer an opportunity to see work actually done."

It also will be noted from the layout that the entire shop is exposed to the customers' view. While it is not desirable to have customers roaming about the place, much is gained by letting them see the complete equipment and the business-like way in which the work is carried through. Certain restaurants have seen fit to do some of their baking and cooking right in the entrance and their methods have won customers because the latter are not left to guess as to their methods of preparing food.

Certain pieces of apparatus used in service stations, whether a tire service station or any other kind, not only are valuable as time-saving, profit-making equipment but impress customers so thoroughly that they become permanently sold on the organization.

Take an instance applicable to a tire service station. Very often one sees a customer bring in a tire for repairs which still is on the rim. Before he can get an estimate on the job the tire must be removed and this job frequently is turned over to a boy or someone else

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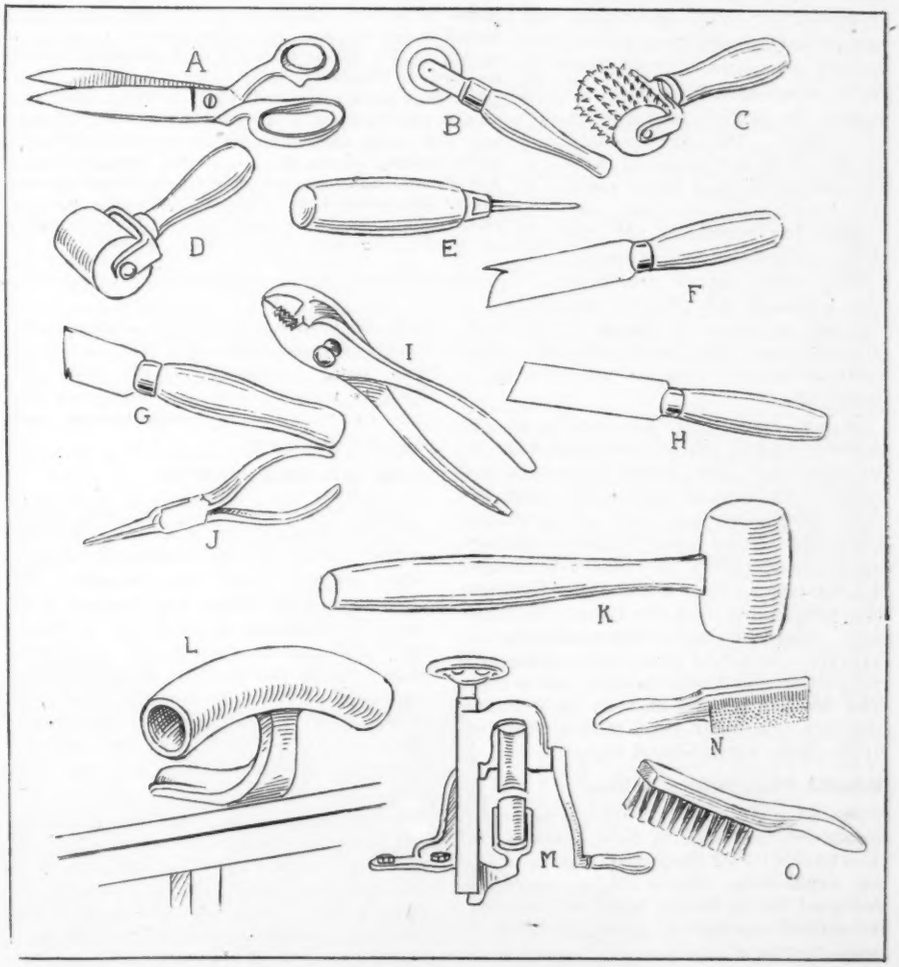


Assuming that the tire service station layout on these pages is for a three-man shop, the following tools will be necessary: Two pairs of shears A; three stitchers, B; one porcupine roller, C; one flat roller, D; two prick awls, E; one large notch knife, F; two small notch knives, G; one 6 by 1 in. knife, H; two pairs of pliers, I; one round-nose pliers for tubes, J; one rubber mallet, K; one tire holder, L; one bench tread-roller, M; two wire hand-brushes, N and one shoe handle brush, O. In addition it is well to have on hand a 2-lb. hammer, two tire irons, a quick rim spreader, two small cans for gasoline and one safety gasoline can

The Used-Car Business in the South

What New Orleans Dealers Think of It—Main Use is as Outlet for "Traded-In" Cars

THERE is no money in the used-car business.

Used-car trade is not counted upon for a profit by the wise dealer, but holds its place because it allows for the disposal of traded-in cars, and so helps the new car business.

Many used-car departments are operated at a loss in the South, but they make possible a large volume of new car business.

These are the three summaries under which the opinions of New Orleans and other Southern automobile dealers crystallized when a representative of MOTOR AGE asked some twenty-five of them for their views on the merits of the used-car department of a regular agency for the sale of new cars. With remarkable unanimity, the used-car experts and salesmen of the regular automobile sales agencies expressed the first opinion, "There is no money in the used-car business, as a business." It is impossible to quote any one of them or any five or ten of them, but the consensus of their opinion as to Southern conditions carefully set down and sifted through again and again, was about like this:

USED car trade is not calculated by the regular dealers for direct profit. The profit in the used-car business comes through the sale of new cars on which allowances are made for the value of the old cars traded in. The used-car departments of the large automobile-selling concerns are regarded as outlets for second-hand cars which have been accepted in partial payment on new cars. The development of the used-car trade in New Orleans in the past three years has been phenomenal and surprising to virtually all the dealers themselves. From the "junk" stage, it has arisen to the standard of rebuilt machines, in some instances worth only slightly less than new cars, and often fully as durable from having better parts installed.

Read the Experience of a Prominent Used-car Dealer in New Orleans in Disposing of Rebuilt Cars.

"As to the question of price: It has been my experience that a man does not pay nearly so much attention to this factor in buying a used car as is frequently imagined—provided he can be made to realize that he is getting the worth of his money in an honestly and carefully rebuilt car. If he pays a thousand dollars for a used car, and that car gives him service, he will have to think hard a year later to tell you how much he paid for it. But if the car runs, say, 600 miles, and then begins to show defects, he never quits talking about the price and complaining about the way he was stung; never failing to mention the name of the dealer who stung him. One customer who continually does this, and has reason to do it, will do more to hurt any used-car dealer's business than a money panic."

A few years ago, practically all the dealers looked on second-hand cars as so much old iron, steel, brass, tin and rubber. A few of them still hold the same viewpoint, but they are gradually becoming second-hand furniture dealers, old-clothes buyers, or entering similar occupations. The automobile business has proved too fast for them. In those days, used cars were sidetracked in the garages and left to rust, while mechanics worked on them only in their spare time. The dealers seemed entirely to overlook the fact that their good money was tied up in these second-hand cars.

Rebuild Cars Before Selling

To-day, virtually every progressive automobile concern in New Orleans and in other cities of the South, has its used-car department where all the machines accepted in trade are handled, an army of skilled mechanics working on them often for weeks to put one good car in shape. Used cars in New Orleans are selling to-day at $2000 to $3000, in many instances, while dependable, rebuilt machines bring only a few dollars less than their original costs.

The old days, when every man who bought a second-hand car purchased a box of troubles, are gone forever, and frequently the buyer of a used car, which has been properly rebuilt, has less trouble with it than the purchaser of a new car who does not know how to "tune up" his purchase.

Used Cars Look Like New

Most of the used cars on the streets of New Orleans look like new, and they reflect credit on the automobile dealers who prepare them for re-sale. The used car in the South has become a fixture in business, as well as in family life, and has developed into a thriving industry, yet the new car dealers declare and stick to their declaration, that there is no money in the used-car branches of their business, save in its effects—already outlined—on their new car business.

It seems, however, that the main reason for this alleged condition is that the new car dealers who operate used-car branches are contented with results so long as these branches furnish an outlet for their traded-in cars, without figuring a margin of profit, but selling at original cost in trade with the expense of overhauling added on. This must be true, because those men who have devoted their entire time to the used-car business—though they are few in number—seem to be doing about as well, in a commercial and financial way, as the men who devote their main talents to the sales of new cars, and use their rebuilt-car department merely as an overflow for the cars they have been forced to take in trade in order to sell new automobiles.

One of the largest automobile dealers in New Orleans stated his used car department is operated actually at a loss—not a great loss, but, nevertheless, at a loss, considered on a basis of its own returns. "But," he added, "viewed from the point of an assistant to the sale of new cars, and as an outlet for the second-hand cars we take in trade on the new ones, the used-car department is indispensable."

We have every reason to believe that this dealer was telling the truth—as he saw it, and still sees it,—but we also believe that a little closer system applied to his used-car department would make it pay a cash profit in addition to its stimulation of new car sales.

The main sales of used cars in the South are to people living in the agricultural sections. The farmers throughout the South have had banner crops this year, and the sugar and rice crops coming in this Fall will be the largest most of the states ever have had, so that there will be more money for the dealer in used cars if he goes after it right.

Mechanics Buy Many of Them

Mechanics, particularly workers in the shipyards, are the second most numerous buyers of second-hand cars in New Orleans, and other cities of the South, while river-front workers come third. Professional men, and those with small capital engaged in business are about equal in fourth place, while the clerical workers are last on the list.

W. C. Pfeffer, president of the Pedigreed Used Car Co., New Orleans, outlines the situation as follows:

"The used car business in the South has attained a position where service and satisfaction have come to count more with the dealer than ever before, and.

(Concluded on page 55.)

Helping the Power Farmer to Run His Tractor

Another Development of the Traveling Tractor School Idea Which is Doing Much to Stimulate Sales and Make Satisfied Owners

NEARLY all farmers are "from Missouri" in the sense that they want to "be shown." Practice is more clearly understood than precept in the country, for farmers learn to do a thing by doing it.

The tractor manufacturers of the country have understood this for a long time, and various are the ways and means devised to "sell" the tractor idea as much by demonstration as by the printed word. The various field demonstration meets, some National in scope, were held with the idea of bringing together the farmers of a given locality and showing them, by actual field tests, the superiority of the power machine over animals for doing their work.

THE tractor demonstration was of tremendous value in reaching thousands of prospective purchasers, who might otherwise have drifted along for years without becoming sufficiently interested in power farming to consider the purchase of a machine, but of late even the demonstration idea has been contracting, and instead of holding one or two big meets, the manufacturers organized a number of smaller ones, designed to appeal to the farmers in a restricted territory.

A new idea in giving real tractor service to power farmers is being tried out in California, and the first results of the plan have been very gratifying, and undoubtedly the idea will be copied and used in other States, for it is based upon the right principles.

UNDER the auspices of the California Tractor & Implement association, the Agricultural Engineering Department of the University of California, and the State Board of Education, a tractor course has been worked out covering a period of sixty hours of actual work. The school course is limited to sixty students, and these must be made up of owners of machines, their helpers, or others actually interested in power farming.

While some lectures are essential to the course, and these are given by technical men qualified to do so, the whole idea of the course is to teach the students all about the manufacture and operation of a power machine by actually assembling them and putting them through the various kinds of work for which they might be used on an average farm.

Learn Quickly By Actual Practice

The plan is the outcome of many years' experience in the farm implement business on the part of Mr. George Collins, now manager of the California Tractor & Implement association. In the course of his work as salesman, implement dealer and manager of various conerns identified with farm machinery, Mr. Collins was struck with the constantly repeated inquiries on the part of many prosperous and intelligent farmers, to be shown how to repair a machine, and not merely told how to do it.

Even the most carefully prepared instruction book is not always intelligible to the farmer because he lacks the knowledge of the purposes and functions of the detailed parts of a machine referred to in the books. What is perfectly clear to one having some fundamental knowledge or acquaintance with mechanical things, is not clear to an equally intelligent person lacking that acquaintance, and, accordingly, many instruction books that are supposed to be the very acme of clearness and simplicity, are not fully understood by the reader.

To overcome this objection, the new tractor course aims to take the student and actually show him, by demonstration and talk, how a machine is made, why certain kinds of material are used in different parts, the functions of the engine, the levers and other parts, how to make necessary repairs, and the best way to operate the machine.

It will be noticed that the course is given under the auspices of three important organizations, each equipped to supply something of value. As its contribution to the course, the State Board of Education furnished the use of a high school building in the city or town where the school is held.

Usually this building is equipped with the necessary chemical, electrical and mechanical laboratories and shops to supply all the paraphernalia needed for the lectures and demonstrations, so that as the lecturer talks about magnetos and wants to show the principles of the electric current, he can do so with the school equipment. The stated lectures can be held in one of the class rooms, where blackboards and charts are available, and as no charge is made for the use of the school buildings, a considerable saving is thus effected in the expense of the course.

Dealers Loan Equipment

The Engineering Department of the University of California contributes a number of trained teachers and experts in agricultural mechanics, and these teachers are used to teach the students the theory back of the machine, and the purpose of each part. The teaching staff of the course is also augmented by a number of practical engineers and factory foremen loaned by the various manufacturers who are members of the association.

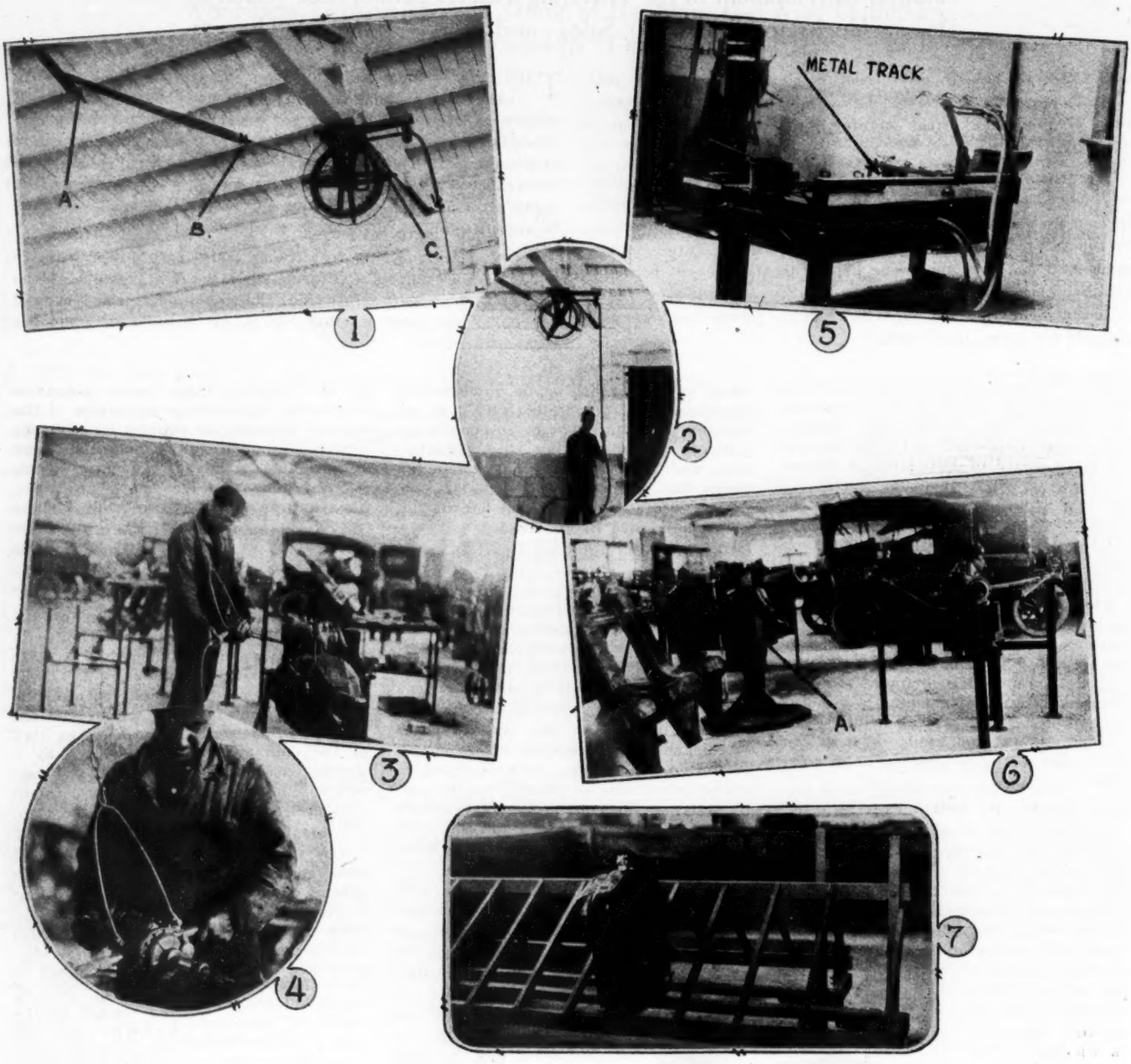
The California Tractor & Implement association not only takes charge of all details connected with the schools, but it furnishes all of the tractors, gas engines and other farm implements needed for the demonstration work. These supplies are usually taken out of stock of the local dealers, and loaned to the school for the course, thus avoiding the shipment of the heavy machines.

At one of the classes already held, equipment to the value of over $30,000 was available for the use of the students. As all makes and types of tractors and implements are represented in the association, no particular company or model is boosted and the entire idea of the course is to

(Concluded on page 29)

Every unit of the tractor is taken apart and reassembled before the students and when the course is finished, most of the men can assemble their particular tractor and make any necessary repairs or adjustments

Here Are Six Money Making Devices for Your Service Station



THE accompanying photographs show a number of novel features that could be easily installed in any garage.

No. 1 and No. 2 show a novel method of arranging an air hose overhead. Ordinarily the hose is supported as shown in No. 1, the reel being kept in this position by means of the two springs A and the chain B. No. 2 shows how the hose is unwound when it is desired to use the air. When a tire has been filled, the operator simply releases the air hose, and it is automatically wound up as shown in No. 1. In No. 1 at C can be seen the air connection to the reel.

Nos. 3 and 4 show how an air drill is supported by a rope and counter weight. This greatly facilitates the handling and operation of the drill. When the workman is through with the drill, it is suspended overhead by the rope and weight.

No. 5 shows a rebabbiting machine which is arranged to slide back and forth on a metal track, thus accommodating two blocks at once.

At the right in No. 6 is a special rear axle support made of pipes bolted to the concrete floor. At the left of this support there is a receptacle for catching oil. At the extreme left in this view can be seen stationary holder for crankcases, and at A can be seen a portable crankcase holder, which is so arranged that the crankcase can be held in any position for repairing.

No. 7 shows special portable racks for holding radiators while waiting for repairs, and after being repaired or painted. Each rack holds ten radiators, and the racks are mounted on rollers, enabling them to be moved from place to place.

Help Your Customers Save Gasoline—

And Incidentally Build More Business for Yourself by Establishing a Routine Service System Affording Greater Economy to Car Owners

THE average price of gasoline is 35 cents. In some localities it can be purchased for less and in others as high as 75 cents. The demand for gasoline this year is two times that of last year. With the increased demand has come lower grade fuel. As the demand increases so will the gravity decrease. So also will the price go up. The demand will undoubtedly always be on the increase.

FROM these brief statements it is possible to draw several deductions. Unless means are taken to effect general economies, the price will soar and it becomes the direct responsibility of every dealer in the country to prevail upon his customers toward obtaining the greatest fuel economy possible. We are all familiar with the fact that the salesman's statements with regard to fuel economy made at the time the car is sold are seldom approached but by careful operation and proper adjustment it is possible to increase the gasoline mileage of practically every vehicle in operation. Estimated from the basis of 7,500,000 cars it is easy to see that several million gallons of fuel could be saved annually by increasing the fuel mileage ten or fifteen percent.

BY ROY E. BERG

TO this end every dealer may profitably effect a gasoline saving by tuning up his customer's cars. To do this it is well to adopt a standard routine system whereby a circular letter is sent each customer stating there in that for a nominal sum his car will be overhauled with a view toward increasing its gasoline mileage. This system should then be applied to the shop and a regular form of overhaul applied to each car.

Friction produced by the dragging of brakes is one of the greatest foes to gasoline economy. The brakes should, therefore, be examined to see that the wheels run absolutely free when the brake levers are released. It should be remembered that this overhaul is not to be a rebuilding job it is merely a general adjusting and therefore it does not include relining the brake drums. Possibly a little kerosene squirted on the brake material will take care of a slight drag, or a few turns of the foot brake hand adjusting nut or the hand brake adjusting nut, for an excessive drag.

Clean and Oil Chassis

Next the chassis units should be thoroughly cleaned and oiled. If the shackle bolts, universal joints and other members are grease lubricated they should be forcibly cleaned with kerosene and new grease applied. The small details do not seem to be of great import but it is the collective results that produce a noticeable saving. Should it be found that any bearings are producing a drag on the free rolling of the car these should be renewed but, of course, the owner should first be notified as the overhaul he contracted for would not include replacement of bearings.

The wheel bearings should be thoroughly cleaned and while it seems almost sinful to advocate the use of kerosene to flush the bearings when they are so in need of petroleum of every kind; it will be profitable, nevertheless, to use it. Several cars may be cleaned with a gallon of kerosene if used carefully and it would take but a short while for the car to make up for the amount used in its overhaul, by its more economical operation.

One factor which is apt to be overlooked is the steering gear and the wheel alignment. Should the wheels be slightly out of line or the steering gear with attendant parts, the drag link and tie-bar be out of adjustment, the tires will have a sideward dragging action as the car is pushed forward which will materially increase the rolling resistance. On most cars the front wheel should toe-in from one-half to three-quarters of an inch.

Grind the Valves

The new Lexington model is adjusted so that the wheels are set without camber and roll straight ahead. The drag link should be adjusted for wear and if it has ever happened that the steering lever has become bent by striking a curb stone or a severe bump, it is possible that the drag link will not line up as it should. To properly align the drag link a cord should be stretched in line with the two centers of the drag link and its extension should center with the forward shackle bolt of the front spring.

After making sure that every unit of the car which might effect the rolling resistance and this factor reduced to its absolute minimum, then start on the engine.

First remove the carbon and then grind the valves. We are assuming that the process of valve grinding is perfectly understood. There is a slight question about valve grinding which some people occasionally raise and that is which type of valve seat produces the best performance, a polished or satin finished valve seat. Having heard so many statements in favor of each type we prefer to leave the question open. However, the important thing is to see that the compression is good and if perfectly ground valves do not produce desired compression, new piston rings should be installed. The mechanical end of the engine being attended to the electrical system should then be gone over.

One condition which very noticeably effects gasoline economy is the manner in which the breaker points are adjusted. If the contacts touch but at one point a noticeable spark will result. This creates excessive heat at the points and limits the flow of current at this position. Also the rise of current in the coil will not be as rapid when the points make poor contact. This evil is readily corrected with the aid of a fine file. After the points touched up so that a full surface contact is made then they should be adjusted for clearance. On the Delco system adjustment should be made to .020 to .0275 in. for all distributers used on four and six cylinder engines.

All Delco distributers used on eight cylinder engines, except Cadillac, should have a clearance adjustment from .015 to .0225 in. The Cadillac distributer should be adjusted to .015 to .020 in. and the Packard should be adjusted from .015 to .0225 in. On the Delco systems, where double contact breakers are employed, a careful examination should be made to determine whether or not both points are operating simultaneously.

Spark Plugs Important

Should there be even a small difference in the timing of these contacts the advantage gained by their use is lost. If it is found that the contacts are not properly synchronized the plate on which the contacts are mounted may be shifted within certain limits after loosening three screws which holds it in place. This operation should be performed with extreme care. On cars having Remy equipment the breaker point should be set to .020 in. clearance. Westinghouse requires .010 in. clearance, Wagner .018 to .020 in.

The spark plugs have a good deal to do with the way in which the fuel is burned. Irregular firing results when the spark plug clearances are not all the same. When the electrodes are too widely spaced poor combustion results and when the points are too close that combustion which takes place is complete enough but the trouble is not all the charge is burned. Missing at high

(Concluded on page 26.)

EDITORIAL

BUY YOUR ADVERTISING CAREFULLY

DON'T spend money for advertising that does not advertise. Too many schemes have been devised by schemers who are well aware of the fact that you know "it pays to advertise," and too many advertisers are wasting a considerable amount of money on some of these schemes.

The automobile has forged to the front and quite a bit of its success is due to advertising. Dealers are well aware of this fact and as a result there is scarcely an automobile dealer or a service station or an accessory dealer anywhere who does not advertise to some extent at least in his local newspapers and by other means which may come to hand. The automobile business advertises as much as any other industry, if not more.

Now there are hundreds and hundreds of what might be termed "fly-by-night" advertising schemes all over the country, and the solicitors for the selling of space in such publications find the average automobile man more or less of an "easy mark." But the principal trouble is that not one out of a dozen of these schemes are worth their salt and money expended in the purchase of this kind of advertising is a dead loss that has to be entered on the debit side of the ledger.

CLUB INVESTIGATES SCHEMES

At Birmingham, Ala., the advertising club has recently adopted a plan for the investigation of these so-called "fly-by-night" advertising schemes, and the result is that the business men of Birmingham are saving hundreds of dollars that they would otherwise spend on some of these schemes and that would ultimately turn out to be a loss.

This club has inaugurated what is known as a "Protection Committee," and whenever an advertising solicitor or a crew of them working one of these advertising schemes or these "fly-by-night" propositions visits Birmingham the advertising club immediately investigates the proposition. If it is worthy and the investment will return the proper dividends, the committee will give the scheme its unqualified endorsement. On the other hand, if the scheme is like most of them, it will not be endorsed and business men will be advised to pass it by.

Scarcely a day passes that some such a scheme does not find its way into the larger cities, and the smaller towns are infested as well though not as frequently. The business men themselves will not take the time to investigate these schemes and many of them will buy advertising space because the thing looks good on the surface. Getting down beneath the surface, however, not one out of a dozen of these schemes would be found worth spending money thereon.

A plan somewhat similar to this has been adopted by the Chamber of Commerce at Macon, Ga., and results are about the same—business men are saving their dollars by not investing in advertising schemes that cannot show the endorsement of the Chamber.

If the various automotive organizations in the various cities would see to it that none of their members advertise in these one-time publications, or these "fly-by-night" schemes, until they have first been thoroughly investigated and then given the organization's endorsement, the automobile dealers would save hundreds of dollars that they are now spending, and wasting, in these schemes, for there is not one out of a dozen of them that will return value for money invested.

VICTORY FOR THE SMALL ENGINE

WHEN the last car finished the Elgin road race August 28 there had been run one of the greatest events in the history of road racing. It was a great achievement for the 183 cu. in. engine. It was an achievement for the makers of tires, spark plugs, ignition systems, in fact, for the makers of every piece of apparatus entering race car construction. It may be true that the race was not spectacular from the viewpoint of the crowd, but to those close to the industry it meant much.

Few, if any, races like the Elgin event ever have been run wherein all the cars entering finished. All of the usual causes of pit stops were absent. The common view of disabled cars scattered here and there around the track was lacking. Spectators were not thrilled by lightning tire and wheel changes, nor were they brought to their feet by the thrilling events which always have livened up the pits during a race, especially when the leaders are separate by seconds only.

But to the men who design and build the cars which dealers have to sell and service, the race was equivalent to running the most elaborate laboratory test on a dynamometer.

TEACHES ENGINEERING LESSON

It meant that from now on we can expect to see wonderful strides in the further development of the 183-cu. in. engine for our commercial cars. The engines in Saturday's race are something like 6 per cent greater in piston displacement than the Ford engine, and yet the winner's fastest lap was made at a speed of 83.75 miles per hour.

A year ago, after the Elgin race had been run with cars of 300 cu. in. piston displacement, MOTOR AGE in the issue of August 28, 1919, predicted as follows:

"This year's Elgin race drove the last nail home in the argument that racing cars must come down to a smaller piston displacement. Like the cars at Indianapolis, Memorial Day, the cars that competed at Elgin were altogether too fast for the course. With 183-cu. in. cars and necessarily greater strides in development of race car engines, it is safe to predict future races will be just as **fast** or **faster** and the cars will **hang together** better."

From the foregoing it will be noted that this year's race proved all the things which this publication has held for the smaller cars. They did travel faster and they did hang together.

Conditions in Industry Better

Bankers Show No Signs of Deserting Manufacturing End —Outlook Encouraging—Less Reason for Perturbation Than a Month Ago—Companies on Firmer Footing

NEW YORK, Aug. 29.—Receivership for the Bethlehem Motors Corp. caused something of a flurry in circles outside the automotive industry but there is no substantial reason for taking it too seriously. As a matter of fact it was perhaps less significant than would appear from surface indications. The plant will remain in operation and there undoubtedly will be a reorganization of the company. The banks, which have claims of $1,700,000, have no intention of losing their money. The difficulties of Bethlehem Motors have no ramifications, so far as can be learned, and no other companies are involved in any way.

It has been pointed out repeatedly by MOTOR AGE that failures would follow in the wake of the post-war readjustment which is now going on. There have been several of them and there probably will be more but there is not the slightest reason to fear an epidemic. In almost every case they have been due to the fact that the companies involved were caught with large but unbalanced inventories when credit lines were shortened and transportation troubles became acute. It became almost impossible to get essential parts or the cash required to carry the plants until completed units could be sold.

AUTOMOTIVE INDUSTRY SOUND

Companies which were able to get along until they could shorten sale by converting inventories into cash and reducing operating expenses in every possible way will be able to reach harbor safely unless they have particularly hard luck. There probably is less reason for perturbation in the industry to-day than there was a month or even two months ago. Many companies which were in a somewhat precarious position have refinanced themselves successfully.

Dozens of ambitious expansion plans have been nipped in the bud and this is by no means an unmixed evil for the factory facilities already available doubtless will be ample to meet the normal demands for some time to come. The increased production which would have been possible with larger plants would have found no immediate market under any conditions as soon as the cumulative demand piled up by war had been satisfied. It is doubtful if it would have paid for the factory extensions even if there had been no slump.

In numerous instances the cash which might have gone into plant enlargements has been diverted into working capital at a time when cash in bank is most essential. This is a sound condition and works for the ultimate good of the industry.

INDIANAPOLIS

General conditions in the automobile industry in Indianapolis have improved perceptibly in the past week. The crisis at the William Small Co. has passed, and the appointment of a receiver on an understanding between the creditors and the company has assured the continued manufacture of the Monroe.

George M. Dickson, general manager of the National, says that prospects are brighter to-day than at any time in the past month. More men were put back to work on Aug. 16; this number was further increased on the 23d of Aug. and by Labor Day large scale production will be under way again. Marmon officials say they now have on their payrolls 4624 employees as against 4900 Jan. 1. Premier has sufficient orders ahead to keep its factory going one year at full production and the only thing needed is a sufficient supply for bodies. Officials say that demand is especially urgent for enclosed bodies.

John Orman, manager of the Indianapolis Automobile Trade association, says that his investigations have shown that the demand for enclosed bodies has increased 70 per cent in the past year.

MILWAUKEE

The present week is one of unusual activity for distributors as well as dealers, it being the occasion of the annual Wisconsin State Fair at Milwaukee. The local dealers' association is not only repeating its elaborate show on the fair grounds, but is carrying out exceptional ideas in motor truck merchandising which give a touch of distinct novelty. August business as a rule showed a falling off from previous months of 1920, both in passenger and commercial car sales. However, the motor show at the State Fair is reaching between 200,000 and 250,000 people from all points in Wisconsin and doubtless will have an important favorable influence on dealers as well as purchasers.

KANSAS CITY

Sales have increased materially since the first of the month especially with the higher priced cars. Though these sales are from 50 to 60 per cent less than this same time a year ago the increased volume especially during the summer vacation period is encouraging, according to dealers here. E. E. Peake, secretary of the Kansas City Motor Dealers association, says that sales are on the increase and business is good with better prospects in the future. The unusual wheat and corn crops being harvested now gives promise of coming good times in this territory. There has been a falling off of the lower priced cars except Fords. Sales on Dodge and other medium priced cars have been steady. Dealers are showing a tendency to watch their time sale paper closer and the credit report on recent applications for time sales shows that the dealers are taking 90 per cent better risks than formerly.

An optimistic spirit has been engendered by the fact that the big banking interests are investing huge sums in the industry and indicates the confidence they have in its future.

Financiers Appraise Conditions

THE automotive industry is much sounder fundamentally than it was when the Federal Reserve Board determined the time had come for deflation. It is rapidly approaching a rock bottom where it can ride safely at harbor until the clouds roll away.

One highly significant fact has developed of late which should allay the fears of those who are apprehensive over the future. It is to be found in the fact that the banks have shown no disposition to desert the automotive industry as it is represented by the manufacturing end. There is evidently no intention of deserting the ship.

Quite the contrary is true, in fact. At least three powerful New York groups are appraising conditions carefully and one of them, which already is heavily interested in automobiles, is investing still more heavily. The Morgans waited until the slump came to get into General Motors. A third group more powerful than either of the others, is prepared to invest huge sums in the industry.

Altogether, the outlook is encouraging.

Kansas District Borrows Large Sum to Meet Its Requirements

Only 3½ Per Cent of Loans Made by Banks Secured by Automobile Paper

KANSAS CITY, Aug. 30—According to J. Z. Miller, Jr., governor of the Kansas City Federal Reserve Bank, the bank has borrowed over $25,000,000 from other Federal Reserve banks to meet the requirements of this district and 684 banks out of a membership of 1,055 in the district have not borrowed from the Kansas City bank. The statement of the bank of Aug. 13 shows that there is due to members reserve account, over $79,000,000. The member banks offer for rediscount at the Kansas City Federal Reserve bank 12 per cent of their total amount of paper. This means that the bankers of the Tenth Federal Reserve District carry 88 per cent of the total paper accepted by them on their own resources.

Only 3½ per cent of the total loans made by the banks of this district are secured by automobile paper. Under the ruling of the Kansas City Federal Reserve bank the banks of the southwest are obliged to carry their own automobile paper and are doing so at the rate of 8 per cent. Seventeen Kansas City banks handle automobile paper on their own resources in limited amounts.

Officials of the Kansas City Federal Reserve bank state that they do not class the automobile as a non-essential but less essential than some other commercial lines demanding credit at this time. The opinion of the Kansas City bank in regard to member banks carrying automobile paper is that the member banks retain the automobile paper on their own resources and offer some essential paper to the Reserve bank for rediscount. Officials of the bank intimated that the member banks can carry their portion of automobile paper easily.

The movement of crops in this district is given as the chief reason for the lack of credit at this time and this condition it is believed will prevail until the corn and cotton crops have been moved.

OHIO JOBBERS TO CONVENE

Columbus, O., Aug. 29—The annual meeting of the Ohio Automobile Jobbers' association, an organization of jobbers in automobile supplies and accessories, will be held at Cincinnati, Dec. 8 and 9 in conjunction with the annual meeting of the Ohio Automotive Trade association which will extend from December 8 to 10.

NEW MUFFLER ON MARKET

Detroit, August 27—Oldburg Manufacturing Co. of Detroit has put on the market a new muffler, interchangeable with the standard Ford muffler. Its extreme lightness and absolute freedom from leaks is cited as the chief factors in favor of the muffler and it is said to be proof against explosion from backfire.

CUMBERLAND TIRE TO BUILD

Louisville, Ky., Aug. 28.—Building plans will be announced in the near future for the Cumberland Tire & Rubber Co., according to Samuel S. Dant, tire dealer, and one of the incorporators of the company, yesterday. The company will manufacture rubber and other goods consisting principally of rubber.

One Banker's Views

The importance of the motor truck and tractor in commerce is recognized by C. Q. Chandler, chairman of the board, First National Bank, Wichita, Kans. This is what he says:

"Bankers must meet the proposition of loans in the automobile industry in a common sense way and learn the value of saying 'yes' as well as 'no.'

"It is regretable that the motor people themselves have pushed the passenger car as much as they have in proportion to the truck and tractor. While there is a legitimate place for the passenger car, and I do not under-estimate this, yet the motor trucks and tractor are already, and will become more and more, a great factor in commerce.

"In driving from my home in Wichita, Kas., to Kansas City two weeks ago, I counted the motor trucks. There were sixty on the road which were loaded with all kinds of freight, household goods, creamery products and building materials. The practical use of the motor truck was thus demonstrated conclusively. Not only will the motor truck be an assistance in transportation, but it is going to greatly improve the farm service.

"We are confronted today with two great problems: transportation and the lack of production on the farms. The motor truck will help solve both of these problems and the tractor will be a great factor on the farm, both because it will increase production and because it will help the farmer in regard to the labor proposition, and for these reasons I think bankers should be careful in their discriminations as regards the whole motor proposition. To properly encourage the use of motors and tractors and the financing of them, will be a very proper thing for bankers to do."

Business Being Readjusted Says Association President

Attitude of Federal Reserve Bank Taken Up at Meeting of Trades Body

ATLANTA, Ga., Aug. 30—The attitude of the Federal Reserve System toward the automobile business formed the principal subject of discussion at a meeting recently of the Savannah Auto Trades Association, which was attended by William L. Mathers, of Atlanta, and P. A. Magahee, president and secretary respectively of the Georgia Automotive Dealers' Association, and which was featured by addresses on the subject by prominent local bankers.

Readjustment or Reorganization

"We should emphasize the fundamental soundness of the motor car industry," Mr. Mathers said. "The automobile business represents a unit of sale so large that banking assistance is needed to help finance purchases in many instances. Business is passing through a readjustment period. Let the laws of compensation and averages operate. Readjustment is better than reorganization."

Speaking from the banker's standpoint William V. Davis, president of the American Bank and Trust Co., of Savannah, said that while he did not fully agree with the placing of the automobile industry on the non-essential list, he believed the automobile dealers' themselves are partly responsible for the situation. This partial responsibility, he said, is due largely to the zeal of some of the new dealers to make quick transactions, and in some instances to accept old machines in trade.

FORD DAILY OUTPUT NEARING 4000

Detroit, Aug. 27—Ford Motor Car Co. rapidly is reaching a point where it will average 4000 cars a day as the normal output. Following a record breaking production July 22, when 4200 cars were built, the factory came along last week with a total of 23,481 cars, an average of 3913 and a fraction, for each of the six working days. During the same period 2388 tractors were produced, an average of 398 each day.

The plant established the record for tractors June 29 when 545 were turned out in Dearborn and the three assembling plants at St. Louis, Des Moines, Iowa, and Kerney, N. J. The tractor record for July was 9,766 produced in the four plants.

TO CONSIDER CAR INSURANCE

Boston, Aug. 27—Consideration of automobile insurance will be one of the subjects when for the first time in the history of mutual fire insurance, the National Association of these indemnity organizations will be held in Boston the week of Sept. 13. A committee on cooperation in recovery of stolen cars and long distance adjustment will be sponsored by C. F. Bowers, vice-president of the Middlesex Mutual Fire Insurance Co.

Legislators Ready to Take Up Bill to Make Gas Public Utility

Despite Failure of Initiative Measure to Pass California Legislature Will Consider Question

SACRAMENTO, Calif., Aug. 28—With the importation of large quantities of gasoline from states to the east, and the letting down of the demand for engine fuel for harvesting, the gasoline shortage appears to have passed, for the present year at least. Co-incidentally, the price increase of 3½ cents a gallon, appears to have come to stay.

There still is a shortage of oil and gasoline in California, the producers insist, which can be met only by importations. These importations, they say, are the sole cause of the increase, as the imported gasoline costs 35 cents a gallon, according to their contention. Mixing it with the gasoline which sold here for 24 cents in the early summer, has brought about the increase, they state.

Conduct Federal Probe

Federal investigation of the causes of the shortage and the price increase, is being conducted quietly by the United States District Attorneys for Northern and Southern California. They promise a thorough search into the situation.

Legislative candidates, in many instances, are announcing their position on the bill which is to be introduced into the Legislature this winter, to make gasoline a public utility. As such, it would be under the control of the State Railroad Commission, and prices charged would be regulated by this body, after public hearings. There is no question such a bill will be introduced, although an initiative measure to this same end failed because the contention did not arise in time for the securing of signatures to the necessary petitions. Two years ago the oil companies were successful in keeping any sort of legislation regulating their business from being passed.

Injunction Against Bus Line Asked by Railway Company

Aurora, Ill., Aug. 27—The Illinois Public Utilities Commission has set Sept. 25 as the date for hearing the application of Joseph K. Choate, receiver for the Aurora, Elgin & Joliet interurban line, for an injunction prohibiting the operation of the newly organized Smith bus line between this city and Batavia, a distance of 10 miles, until the bus line has filed a certificate of necessity or convenience and a copy of its tariffs. The receiver also complains that the bus line is a competitor of the traction line. It is charged that the buses leave the two terminals five minutes before the departure of the electric cars and endeavor to handle the business that belongs to the complainant. The fare charged by both lines is the same.

Rochester, N. Y., Aug. 28—Unless the Public Service Commission of the state, with the approval of the common council and particularly the law committee of the council issues certificates of convenience and necessity to the seven bus lines in this city, which, it is claimed, are operating without them, the lines will have to discontinue operations and service will be denied to thousands of persons of the country districts. Commissioner Barhite has denied that there is railroad or electric car influence behind the complaints. A further hearing on the matter will be held by the commission Oct. 29.

ORGANIZE MOTORISTS' SERVICE

Milwaukee, Wis., Aug. 28—The Milwaukee Motorists' Service, Inc., has been organized at Milwaukee, Wis., and incorporated for $15,000 by a number of private owners, represented by H. E. Cogeshall, C. E. Bostwick and J. W. Lewis. It is a co-operative concern which will maintain a headquarters repairshop, tire and automotive equipment store, and conduct a personal service to all who become members on payment of $15 per annum.

Car Insurance Held Advisable in View of Wet Confiscations

Seattle, Aug. 27 — Hazards against winning back automobiles confiscated by the federal government for carrying intoxicating liquors are so great that insurance is advisable, if possible to obtain, declares E. L. Skeel, general counsel of the Washington State Automobile Chamber of Commerce. He predicted prosecutions eventually would be confined largely to the Volstead law which gives a dealer selling cars on contract, which are used in hauling liquor, relief when it comes to getting back the dealer's equity in the seized car.

Under the internal revenue and customs regulations, said Mr. Skeel, it was almost impossible for a dealer to get back his equity in a seized car, but some federal judges and district attorneys are inclined to limit prosecutions under the more equitable act.

Factory Rights in Buying Back Cars Are Brought Into Court

Company Seeks to Have Distributor Return Automobiles at Price He Originally Paid

INDIANAPOLIS, Aug. 27—An interesting legal question of the right of an automobile factory to repurchase the cars sold to an agent at the original sale price after the market price had been advanced by the company was brought up last week in a suit filed by the Oakland Motor Car Co. against Lee F. Justice, formerly Oakland distributor in this territory.

The question was brought up in a suit for injunction filed by the Oakland company against Mr. Justice in the superior court asking that he be restrained from selling the Oakland cars in his possession at less than the advertised retail price, and that he be compelled to turn the cars back to the factory at the price he paid for them under the terms of the contract.

Maintains Right to Increased Price

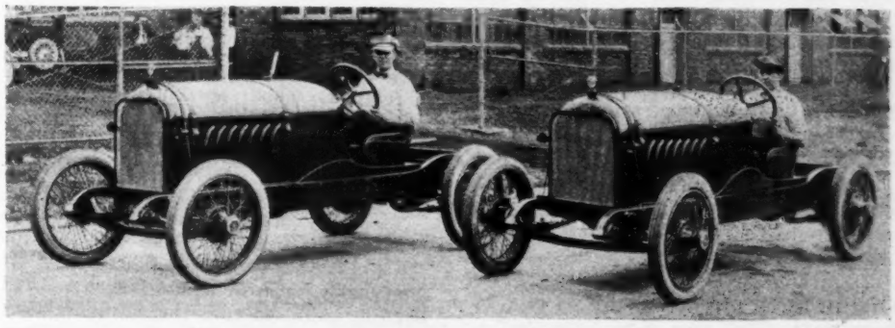
Mr. Justice contends that he is entitled to receive the present price on the cars, which is higher than the price he originally paid, on the ground that the machines could not be duplicated for the price originally paid.

Judge Theophilus J. Moll granted a temporary restraining order forbidding Mr. Justice to sell the cars he now has at less than the advertised price.

NAMED TO HANDLE OWEN MAGNETIC

Wilmington, Del., Aug. 27—Receivers have been appointed for the Owen Magnetic Motor Car Corp., which has a plant at Wilkes-Barre, Pa., but is a Delaware corporation, upon petition of Uri W. Hungerford of New York, creditor and stockholder. The receivers' names were Charles F. Ross, New York, Robert Pennington, Wilmington and James Harris of Wilkes-Barre. The receivership petition was made with the consent of the company and the interests of all the creditors.

Entered in Pike's Peak Hill Climb



A great field of specially designed cars have been entered for the Pike's Peak hill climb Sept. 6. Here are two of them, of the Lexington Motor Car Co., Connersville, Ind. They are stock cars except that they have been equipped with special bodies

Polack Tire Company Sold to Buckeye Rubber Products Co.

Product Will Be Manufactured in Connecticut Pending Erection of Factory in Ohio

NEW YORK, Aug. 27—The Buckeye Rubber Products Co. of Cleveland, with a factory at Willoughby, O., has purchased the Polack Tyre & Rubber Co., which was organized in 1912 by Hugo Hoffstaedter. The Buckeye company, headed by E. B. Tozier, is controlled by men formerly connected with the United States Co. and the Mason Tire & Rubber Co.

The new owners will continue operations in the leased plant of the Polack company at Bridgeport until a duplicate factory can be erected at Willoughby. The Bridgeport plant then will be abandoned. General offices will be retained in this city. Manufacture of the Polack tyre will be continued but present plans do not contemplate the making of pneumatics.

Introduced Continental Tire

Mr. Hoffstaedter is widely known in the tire industry. He was one of the pioneers who introduced the old Continental tire into this country some fifteen years ago. He installed the first pneumatic tire repair and service station in New York for the Continental company and made similar installations in the principal cities of the United States. He was connected with the automotive industry in England and other countries and has traveled in nearly every part of the world where automobiles are used extensively. His future plans have not been announced.

Ford Shows How Wheat Is Cut, Threshed and Made Into Bread

Detroit, August 27—Henry Ford has planned a innovation for state fair visitors at his farm. An invitation has been extended to Fair visitors to come to the farm and witness a demonstration of farm machinery. Ford will show the visitors how the ground is ploughed with the tractor. Another demonstration will show wheat being cut and threshed, sent to the mills, ground into flour, hauled to the bakery and baked in the presence of visitors by machinery. The only time when machinery will not be used in the demonstration will be in feeding the bread, biscuits, etc., to the visitors as soon as it leaves the oven.

The demonstration is designed in furtherance of Ford efforts to show the advantage of the use of tractors and other farm machinery.

CARL H. PAGE WITH SAXON

Detroit, August 20—Carl H. Page, head of the Carl H. Page Co., New York, distributor of Chalmers and Jordan cars and one of the best known men in the merchandising field, has been made director of sales, service and advertising for the Saxon Motor Car Co. C. L. Fox, sales manager, resigned to enter other business but has not announced his plans.

While Mr. Page will have full charge of the three departments, M. A. Hollinshead will continue as advertising manager, J. H. Hickey as service manager and C. P. Hennessy, assistant sales manager, becomes sales manager. C. E. Jacobs is acting chief engineer in place of W. H. Radford, who resigned some time ago. Fred Wilkins is production manager in place of H. S. Lee, also resigned.

MORE ROOM FOR BUICK

Flint, Aug. 27—Buick Motor Co. is rushing work on an additional story on factory No. 8 and an addition connecting that building with No. 4 in the hope of completing the improvements within forty-five days. The addition will give the factory 128,000 sq. ft. of added floor space. Still another addition to building No. 28 will furnish 105,000 sq. ft.

Greater Precautions Taken by Dealers in Time Payments

Credit Bureau Handling Large Amount of Automobile Paper Reports Fewer Repossessions

KANSAS CITY, Aug. 27—"In 70 per cent of the cases in which cars are sold on time payments our records show that the dealer should not have made the sale," said Robert Leiderman, manager of the Automobile Trade Credit Bureau, the only automobile credit bureau of its kind in the country. "In the past the dealer sold many cars regardless of the credit report which we gave him on the risk but now dealers are taking greater precautions and fewer repossessions are the result."

During the past year the bureau has handled over $682,000 worth of automotive credit paper. The staff is composed of six attorneys versed in commercial law and credit. Twenty-four security houses, seventeen banks and over seventy local dealers are members of the bureau.

Get All Possible Data

Its activities are varied and numerous. Reporting on credit risks is a major but a relatively small portion of the service extended. It is impossible for a fraudulent mortgage to be passed in a motor car sale in this city without the knowledge of the sale coming into the bureau.

The work of the bureau embraces the recovery of stolen cars and lost cars for the holder of paper on these cars. It also makes reports to the insurance and bonding companies on the moral liability of the automobile risks they are asked to assume. When the payments on a car become delinquent the bureau repossesses the car for the holder of the paper.

Barker General Manager of Sales for Maxwell-Chalmers

Succeeds B. A. Lyman—Representatives of Company Pledge Co-operation With New Forces

DETROIT, Aug. 27—Co-operation with the new controlling forces of the Maxwell-Chalmers organization was enthusiastically pledged by 200 Maxwell-Chalmers distributors and branch managers at a meeting here. The meeting was held on Wednesday for Western representatives of the company and on Thursday for those from the East, both being addressed by Walter P. Chrysler, vice-president of the Willys Corp., who was recently appointed chairman of a managing committee for Maxwell-Chalmers by financial interests supporting the company.

During the meetings it became known that A. E. Barker of the Dodge Brothers sales organization had been made general sales manager of Maxwell-Chalmers, succeeding B. A. Lyman, who held the title of director of sales. It was also stated that C. C. Hanch had retired as general manager, though no announcement was made as to his successor.

The distributors were informed that steps had been taken to assure both quantity and quality in the production of Maxwell cars and trucks and Chalmers cars.

FORD DEALERS HANDLE TRACTORS

Detroit, Aug. 27—Ford Motor Co., dealers throughout the country now are handling tractors. This is in pursuance of the plan announced several months ago that beginning August 1 all Ford car dealers would handle tractors. While the handling of tractors is not compulsory, according to officials, every dealer is expected to abide by the ruling or suggestion.

SHERWOOD HALL DIES

Grand Rapids, Mich., Aug. 27—Sherwood Hall, chairman of the Sherwood Hall Co., Ltd., died on Aug. 13. For fifty years he had been connected with the company as an employe, partner, owner and chairman. He will be succeeded as chairman by his son, Albert V. Hall. Horace D. Shields has been elected general manager retaining at the same time the office of treasurer. Clyde E. Brown, who like Mr. Shields, has been with the company since its organization will continue as secretary. There will be no interruption in the business through the death of Mr. Hall.

TO DISSOLVE TRACTOR COMPANY

Columbus, O., Aug. 28—A meeting of the stockholders of the Tractor Power Farming Co. of Columbus has been called for Sept. 16 when steps will be taken for a dissolution of the corporation. The company was chartered about four months ago with a capital of $100,000 to operate tractors for farm work.

Motor Vehicles in Country Reach Total of 7,904,271

Increase During Year Ending July 1 of 1,500,000—Ohio Has Biggest Gain

NEW YORK, Aug. 27—The registration figures for July 1, 1920, as compared with a year ago show a gain of more than 1,500,000 motor vehicles. The total number in use in this country is now 7,904,271 and the number is almost certain to pass the 8,000,000 mark when the final totals for 1920 are compiled. Every state except Montana has a larger number of registrations than on July 1, 1919, the largest gain being registered in Ohio which shows an increase of 102,174. Ohio has again taken the first place in total registrations as well, having 567,000 cars and trucks registered.

New York, while higher than on July 1 of last year, has less than the 1919 total for the full year but New York registers heavily during the last six months of the year due probably to the fact that the registration laws are not strictly enforced in some rural districts until after the harvest. Pennsylvania made a decided gain and is now second only to Ohio in total registrations. Among other states to make good gains were Oklahoma and West Virginia, the latter having the largest percentage of increase over the July 1, 1919 total of any state. West Virginia increased 55.67 per cent while at mid-year this year it had registered 39.60 per cent more motor vehicles than during the entire year of 1919.

One Car to Every 13.52 Persons

With the 1919 population estimate as a basis there is now a motor vehicle for every 13.52 persons in the United States.

Although exact figures as to the number of trucks are not available there are on the basis of twenty-seven states which segregate their registrations, about 975,387 trucks in use throughout the country as against 674,300 on January 1, 1920.

The various states have received as license fees the sum of $66,846,551.

Accurate motorcycle figures are not available but careful analysis of those received indicates clearly that the total number of motorcycles in this country has decreased appreciably since last year.

Necessity of Motor Vehicle Discussed at Trade Picnic

Columbus, Ohio, Aug. 27—The first guns in the campaign started by the Columbus Automotive Trade Association aided by the Ohio Automobile Trade Association to show the public that the motor vehicle is a necessity were fired at the annual picnic of the former association Aug. 25. In the absence of F. E. Moskovics, vice-president of the Nordyke & Marmon Co., who was to speak on the subject, Franklin Rubrecht of Columbus made a convincing argument showing the great necessity and usefulness of the automobile and motor truck.

Guests of the automotive association were about a score of bankers from Columbus. R. H. Schryver, president of the Citizens Trust & Savings Bank, spoke for the bankers urging conservatism in the automobile industry. He stated that the financing of business at present caused a heavy drain upon the finances of the country and asked that the dealer sell motor vehicles for cash or as nearly so as possible to aid in relieving the strain. He also said that persons without sufficient means to do so were purchasing motor vehicles.

LAMP FACTORY TO BUILD

Indianapolis, Aug. 27—Construction of two factories of the National Lamp Works of the General Electric Co. for the manufacture of incandescent lamps will begin shortly. The company proposes to erect a finishing plant and a glass works at a cost of more than $1,750,000. Miniature incandescent and automobile lamps will be manufactured at the Indianapolis plant which will have a capacity of 160,000,000 lamps a year.

Southern Wood Products Co. to Build Automobile Body Plant

Shuler Axle Manufacturing Co. Also Proposes Erection of $1,000,000 Louisville Factory

LOUISVILLE, KY., Aug. 27—Another automobile body plant will be in operation in Louisville within the next two months, according to an announcement made by Leo Klarer, Jr., secretary-treasurer of the Southern Wood Products Co. The new plant which will be erected on the site purchased six months ago will be in addition to the present factory which is devoted exclusively to turning out building wood and material.

The Shuler Axle Manufacturing Co., manufacturers of automobile axles, will erect a new plant on the site of the old Central Stockyards Co., at a cost of $1,000,000.

TO MAKE GAS TANK CAPS

Poughkeepsie, Aug. 27—The Pouvail-smith Corp., which manufactures a line of steering wheels and Bakelite products, is about to manufacture a line of Bakelite gasoline tank caps on which it will be in production about October 15. The caps will consist of a Bakelite top with a brass threaded piece. The line will be prepared first for the jobbing trade.

MAKING NEW TAIL LIGHT

Saginaw, Mich., Aug. 18—A. W. Hemmeter and O. W. Sowatsky have begun the manufacture of a tail light, operated from the steering wheel, which not only carries the red but flashes a green light to show when the driver intends to stop or turn. Engineers have pronounced the device a success and the factory is turning out 150 a day.

Finance Company to Handle Motor Vehicle Paper Formed

American Finance Co., $5,000,000 Corporation, Gives Cincinnati Dealers New Facilities

CINCINNATI, Aug. 29—The American Finance Co., to specialize in the purchase of secured notes from automobile, motor truck and farm tractor dealers, has been incorporated here with authorized capital stock of $5,000,000. All common stock will be issued, divided into $10 par value shares. The first $2,000,000 of the capital is to be sold at $10 a share and the balance at $12.50 a share. Arrangements are made to pay stockholders at the rate of 8 per cent.

George W. Platt, president of Platt Brothers Co., investment brokers of Cincinnati, who is handling the organization details, said yesterday:

Operation in Sixty Days

"Cincinnati is the only large city in the country not possessing a large company in the business of financing motor vehicle paper. The new automobile financing company will be in operation within sixty days. A large volume of business has already been offered and a successful institution is assured from the start. A merger of one or more smaller companies will be effected immediately."

The organization committee, in addition to Mr. Platt, consists of Joel C. Clore, postmaster of Cincinnati; Fred E. Wesselman, county clerk and James I. Stephenson, president of the Cincinnati Iron & Steel Co.

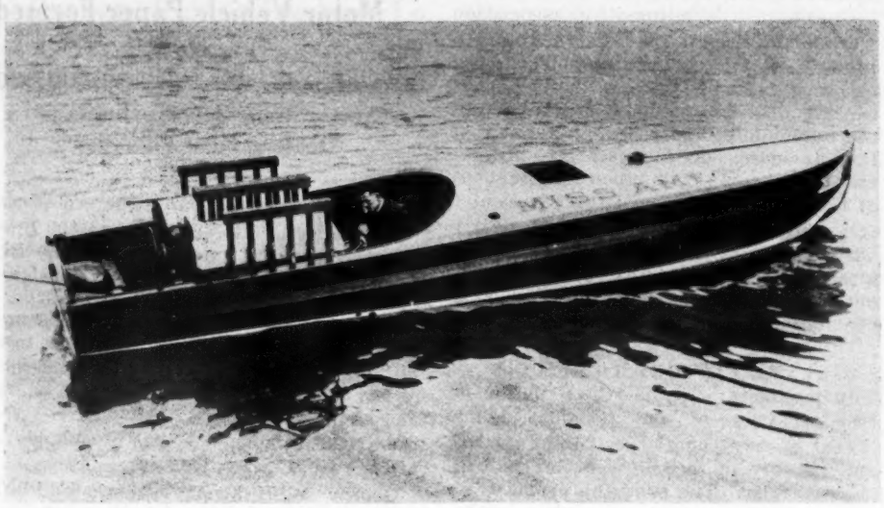
Boston, Aug. 82—The Automatic Acceptance Corp., Boston and New York, to handle acceptances and evidences of debts secured by motor vehicles, has been incorporated here with a capitalization of $500,000.

Truck Dealers Arrange for Six Day Tour Through Kentucky

Cincinnati, Aug. 29—Final arrangements are about completed for the second motorize-the-farm tour to be conducted under the direction of the Cincinnati Truck Dealers Association through principal cities in Kentucky for six days commencing Aug. 30. The first truck tour held last June through Eastern Indiana and Ohio proved so successful that the members of the association decided to hold a second tour to give the farmers of Kentucky an opportunity to see the modern truck in operation.

A. H. Kroh, who has a completely motorized farm of less than 200 acres, will speak at stops on the tour on "Increased Production and Better Marketing by Means of Motorization." Harry G. Frazier, who was with the motor transport division in France will tell of the part the motor truck played in the war and what it is doing in this country to overcome transportation obstacles.

MISS AMERICA, WINNER OF INTERNATIONAL TROPHY



Miss America is equipped with two Smith Liberty engines developing a total of 800 horsepower and can do over sixty miles per hour

BY W. F. BRADLEY

European Correspondent of Motor Age

COWES, ENGLAND, Aug. 13—The British International Trophy, the world's most important motor boat event, has been secured for America by the victory of Miss America, a boat owned by Mr. Garwood, and built by Smith Brothers, of Algonac, near Detroit, and driven by two Smith-Liberty engines of 800 total horsepower.

Under the rules, the races had to be continued until one country had won it twice, but it was not necessary for the same boat to win on each occasion. Every part of the boat had to be produced in the country of origin, and all members of the crew had to be natives of the country they represented. Miss America won on the first and second days, her average speed for the first day being 51.45 knots (59.19 land miles) and for the second race 53.42 knots (61.46 land miles).

There were originally three American challengers, for Miss America had a bigger sister, 38-ft. overall, also built and engines by the Smith company, and A. L. Judson had put in Whip-Po'-Will, a 28-ft. boat with two Bugatti-King engines. Three days before the race, an explosion occurred aboard Whip-Po'-Will and in the fire which followed she burned down to the water's edge and sank. The two Americans thus had to meet three Britishers, for the two French boats which had been entered were withdrawn owing to their lack of speed, and the Spanish entry did not materialize.

Increase in Gas Production But Greater in Consumption

Statistics For First Six Months Show That Higher Stock Level Was Reached

WASHINGTON, Aug. 28—Statistics compiled by the Bureau of Mines show that during June, 307 refineries were operating with a daily capacity of 1,601,295 barrels of crude petroleum as against 292 refineries with a daily capacity of 1,356,355 barrels in December, 1919. The daily average of crude run to the stills was 1,163,536 barrels. This is 73 per cent of the rated capacity of the plants as against 77 per cent in December, 1919.

Gasoline continues a high record of production during June and the six months' production is approximately 13 per cent larger than the first six months of 1919.

The domestic consumption of gasoline during the first half of 1920 is 28 per cent greater than during the same period of 1919, while the total consumption of gasoline is approximately 32 per cent more.

Although stocks reached a higher total in 1920, the seasonal decline began in May or two months earlier than in 1919. At the end of June, stocks are 89,841,009 gallons or 15 per cent less than at the same period in 1919. A continuation of this rate of consumption will bring the stocks to less than a month's production at the end of July, a condition similar to that existing in the year 1918.

OPEN FRESNO COURSE IN OCTOBER

Sacramento, Calif., Aug. 27—The new $250,000 speedway at Fresno will be opened on Oct. 2 by Governor W. D. Stephens who has accepted an invitation to be present at that time. The occasion is the annual district fair of the San Joaquin Valley, which is to be featured this year by an automobile racing card.

Sanction of the American Automobile association's contest board has been asked for the speed events. Several drivers of national reputation will compete for the prizes which have been offered.

No Records Broken in Annual Climb Over Mont Cenis Pass

Reville, Amateur Driver of the 1913 Grand Prix Peugeot, Wins Over Masetti

BY W. F. BRADLEY

European Correspondent of Motor Age

PARIS, Aug. 6—Confined to amateur drivers, by reason of the decision of French and Italian car manufacturers not to race before 1921, the annual 12 3-4-mile hill climb over the Mont Cenis pass, in the Italian Alps, did not see any broken records.

This is the longest distance hill climb in the world and one of the most difficult, for while there are several easy stretches the last two or three miles are practically all hairpin turns with severe gradients. The real interest of the race lay between Reville, the amateur driver of the 1913 Grand Prix Peugeot with which the late Georges Boillot established the Mont Ventoux record; a 1914 Fiat Grand Prix machine driven by Count Masetti, and a 12-cylinder Packard fitted with a beautiful stream line racing body and driven by the Italian Silvani.

Racers Closely Matched

These three were closely matched, but on the last half mile the Fiat punctured and had to run on a flat tire; the Packard cracked a piston after going up the most difficult portion of the route known as the "Staircase," and Reville on his Peugeot came in a winner in 19 min. 51 sec., or 32 1-2 sec. slower than the record set up by Felice Nazzaro on a big Fiat in 1905. The 1914 Fiat was beaten by the Peugeot with a margin of 27 sec.

TO SHOW IGNITION FILMS

New York, Aug. 30—The Automotive Service Association of New York will start off the fall season with a meeting on Sept. 9 at the Dealers Association at which the North East starting, lighting and ignition films will be shown. The ignition part of the film is entirely new and will have its first New York release at that time. Neal G. Adair, editor of Motor World, will also speak on the growing importance of good service to the sale of cars and trucks. The association is one year old, has two hundred members and will start the publication of a monthly bulletin, the first issue to be off the press Sept. 1.

HYDROPLANES FOR TWO CITIES

Cincinnati, Aug. 28—Assurance that in the future passengers and freight would be carried via air between Louisville and Cincinnati at a saving of both cost and time has been given by F. M. Deeds, vice-president of the Ohio Valley Aero Transport Co., Louisville, following the initial flight from that city to Cincinnati of two hydroplanes.

Dealers to Manage Automobile Show at California State Fair

Dispute Over Display Space Rates Causes Shifting of Management From Agricultural Society

SACRAMENTO, Calif., Aug. 30—As a result of a controversy between the directors of the Sacramento Motor Car Dealers' association over rates for display space at the California State Fair, the management of the automobile show of the Fair has passed into the hands of the dealers. They will endeavor to make the show state-wide in character, instead of almost purely local, as heretofore.

The State Fair asked a 300 per cent increase in exhibit space rates, with the plan of putting the automobiles in the same department with trucks and tractors in the new Farm Power Section. To both these arrangements the Sacramento dealers objected, and a compromise was effected by which the dealers will have complete management of the show, which will be separate from the Farm Power Department, which is under the direction of the California Tractor association.

Invitations to dealers all over the state have been issued, and upon the foundation being built this year, it is planned in succeeding years to erect a show which will represent dealers of every section of the state, and which will be the biggest of its kind in the west.

The dates of the state automobile show this year are Sept. 4 to 12.

DORRIS COMPANY NOT AFFECTED

St. Louis, Aug. 30—It is announced by officials of the Dorris Motors Corp. and the Dorris Motor Car Co. that the receivership proceedings brought here against the Motors corporation will have no effect on the manufacturing company. The corporation, a $3,000,000 concern, was organized last January to purchase a controlling interest in the Dorris Motor Car Co. and the stockholders petitioning for the appointment of a receiver claim that stock was sold them through misrepresentation in that they believed that they were buying shares of the company and not in the corporation. Purchase of control of the company, officials of the corporation say, has been deferred because of the money stringency.

TRUCK LINE INCORPORATES

Danville, Ill., Aug. 27—The Chicago, Kankakee, Watseka & Danville Motor Truck Co. has been incorporated with capital stock of $100,000. Headquarters will be in Kankakee, and Edward Regnier, one of the incorporators, will be general manager. The completion of the Dixie Highway between Chicago and Danville, giving a concrete road for the entire distance, makes it possible to operate a truck line daily between the two cities. Products of the city and farm will be carried to Chicago and goods for the merchants along the route will be brought back. A Chicago terminal has been provided and a stop will be made at Chicago Heights. Ten trucks will be operated at the outset and these will be added to from time to time as business develops.

Ship-By-Truck Bureau in Kansas City Changes Hands

Kansas City, Aug. 28—The recent order order of the Firestone Tire & Rubber Co. discontinuing the sixty ship-by-truck bureaus established throughout the country with the central bureau located at Akron, O., was due to a policy of economy according to former members of the Firestone ship-by-truck bureau here. Royal Fredman, formerly manager of the bureau, has been placed in the field as a line salesman and the records and work of the bureau has been turned over to the ship-by-truck terminal recently organized by W. T. Bancroft, manager of the Suburban Motor Transportation Co. of this city.

The work of the Kansas City bureau has been very successful in this city and immediate territory. A number of lines have been scheduled running out of Kansas City giving daily service to about seventy towns in Missouri and Kansas. The movement crystallized recently in the establishment of a ship-by-truck terminal owned by the Transportation company and used by the suburban truckers.

MOLINE PLOW IN CANADA

Weston, Ont., Aug. 28—The Willys-Overland Motor Co. has purchased the buildings and four and a half acre site of the Roman Stone Co. of Weston. It is understood the buildings, which contain 40,000 sq. ft., will be occupied by the Moline Plow Co., which is establishing a branch in Canada.

Moving Exhibit of Tractors Holds Interest of Farmers

Belt Driven Machinery Kept Almost Continually at Work During Iowa Demonstration

DES MOINES, IA., Aug. 27—Several hundred Iowa farmers saw the first complete power farming demonstration ever put on in the state when the Herring Motor Co. and the Des Moines branch of the Ford Motor Co. staged a three day demonstration on the farms of the Iowa State Agriculture college at Ames.

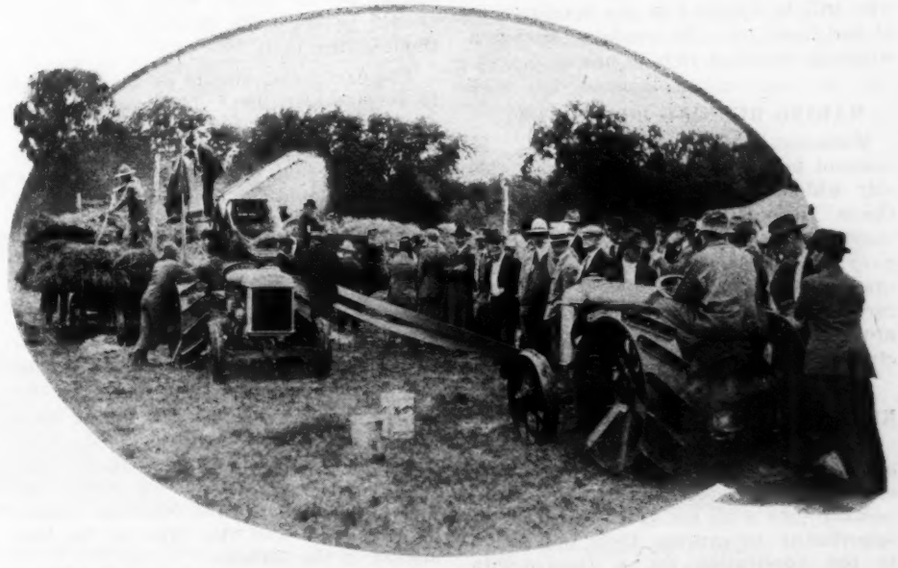
Tractor demonstrations and shows of the past have been confined largely to plowing, disking and drilling. This one showed the great variety of farm work which the tractor could take over. The demonstration was under the direction of A. E. Hildebrand, director of the national tractor demonstrations and was held on a 100 acre farm belonging to the college, located half a mile north of the campus.

It was a glowing illustration of the old theory that a moving exhibit is the best kind of an exhibit for if any of the machinery was idle for a few minutes it soon lost interest to a greater part of the crowd and as soon as another started up it became the center of attraction.

HASSLER WINS INJUNCTION SUIT

Indianapolis, Aug. 27—Judge A. B. Anderson in the United States District Court here has held the automobile shock absorber manufactured by the Van Briggle Motor Device Co., to be an infringement on the absorber made by Robert H. Hassler. A perpetual injunction has been issued restraining the Van Briggle company from the manufacture and sale of the type of shock absorber involved.

Fordson Distributor Stages Tractor Demonstration



This is one of the many instructive performances at the first complete power farming demonstration staged in Iowa when several hundred farmers attended. The importance of keeping the exhibits moving proved of great value in sustaining the interest of the visitors

Ford Technical Institute to Better Education of Employees

University Plans to Confer Degrees in Mechanical, Electrical and Chemical Engineering

DETROIT, Aug. 27—With a course of study equal to that of any technical institution or university in the country, conferring degrees in mechanical, electrical and chemical engineering, the Ford Technical Institute for higher education of Ford employes will be opened this fall. Announcement of this latest move in the campaign for the betterment of the educational advantages of Ford employes has been made by Edsel Ford.

The plan to open the institute with university rank and conferring degrees, has been under discussion for some time between Henry and Edsel Ford and Superintendent Searle of the Ford educational department. The manufacturer contends that the system in vogue offering academic and English courses and the service school for employes of dealers needs but the courses in the higher technical branches to put students in the front rank of the profession.

High Standard of Instruction

It is pointed out in the announcement that the students will not be dependent on meagre equipment but that millions will be expended in making the institution the equal of any in the land in point of equipment and standard of instruction.

The institute will be open to every Ford employe, an approximate total of 100,000, including automobile, truck and tractor employes, railroaders, lumber camp and saw-mill employes and the miners that are working in the Ford property in Kentucky as well as those who will be engaged in the development of the huge tract in northern Michigan which is declared rich in ore.

MAKING RUNNING BOARD NEAT

Muskegon, Mich., Aug. 28—W. E. Jeannot heads The Mat Company of this city which is putting on the market a Cocoa Fibre Running Board Mat under the trade name "Neverslip." The company formerly was engaged in the manufacture of door mats but the demand for mats for automobile running boards prompted officials to devote attention exclusively to their manufacture.

REORGANIZATION FOR BETHLEHEM

Philadelphia, Aug. 27.—Indignation expressed by the merchandise creditors of the Bethlehem Motors Corp. because they were not given an adequate opportunity to express their opposition to the application for a receivership which has been granted in Federal court by Judge Dickinson. The petition for a receiver was granted on a bill in equity brought by Keck & Bros., Allentown, creditors to the extent of $26,306 for lumber. The company did not demur. Plants of the corporation are located at Allentown and Pottstown, Pa.

Reorganization of the company with issues of new stock, is believed to be contemplated by the banks. It is intimated that the merchandise creditors will insist upon having representation upon whatever committee is named to work out the details of refinancing and reorganization.

Clinton Woods, who has been general manager of the company since last May, was named receiver by Judge Dickinson with authority to continue business.

It was alleged by counsel of both the creditors and the corporation that the company is solvent. Its assets were estimated at $4,900,000 and its liabilities at $3,000,000.

TRACTOR SHOW NETS BIG SALES

Sedalia, Mo., Aug. 27—The tractor exhibition held at the Missouri state fair, Aug. 14-21, under the direction of the Kansas City Tractor club, was a decided success from a business standpoint as more than $150,000 in actual sales were made during the week. Attendance was over 65,000 on the best days. No practical demonstrations were held though the tractors proved their utility by pulling several concessions out of the mud following a heavy rain.

Help Your Customers Save Gasoline

(*Concluded from page 17.*)

speeds is very often caused by widely set points, and missing at idling speeds may be caused by points too close together. Twenty-five to thirty-thousandths-inch is the correct clearance for single point spark plugs. On plugs using multiple points one gap should correspond to the above while the others should be set from thirty to thirty-five thousandths inch.

The carbureter should be the last unit to receive attention. The main thought of this whole procedure has been to save gasoline and in the setting of the carbureter this must be further borne out. It should be impressed upon the mind of the owner that race car performance and bullet-like acceleration are not conducive toward the greatest economy. Therefore, the high speed adjustment should be turned down until that most delicate point is reached where backfiring begins. Slower idling should also be obtained by cutting down on the low-speed adjustment. It is found very often that better economy is secured by providing a coiled spring connected directly to the carbureter throttle arm this will tend to always close the butterfly valve and will also take up the lost motion in the linkage.

By careful attention to all these details it is more than probable that a twenty per cent increase in mileage will at least be obtained.

Wisconsin Automotive Dealers Will Organize at State Fair

State Organization Movement Sponsored by Milwaukee Association—Hold Meeting

MILWAUKEE, WIS., Aug. 30—The opening of the annual Wisconsin State Fair to-day at West Allis, a suburb of Milwaukee, marks the most elaborate passenger and commercial car merchandising enterprise that has ever been undertaken by the Milwaukee Automotive Dealers' association. For six years the association has conducted motor shows on the fair grounds.

Trucktown a Feature of Show

Motor Hall, previous used jointly for passenger car and truck as well as automotive equipment displays, is employed this year only for passenger cars and equipment. All motor truck exhibits are contained in "Trucktown," a five-acre tract near Motor Hall, enclosed with canvas walls, and laid out as a regular municipality. One of the purposes of this idea is to induce the state legislature to make ample provision at its next biennial session in January for another large building on the fair grounds for the use of the truck trade.

"The State Fair show this year is designed to bring home to bankers, legislators, business men generally and the farmer, the magnitude of the industry," said William F. Sanger, chairman of the show committee of the association. "The exposition will demonstrate to the banker the absolute necessity of the motor car, both passenger and commercial. Likewise, it will call to the attention of the legislature the great need of a building large enough to house the exhibits of the second largest industry in the world."

To Form State Body

One of the most important events of State Fair week will be the general meeting to be held Wednesday, Sept. 1, at the Milwaukee Athletic club, to form the first formal organization of automotive dealers in Wisconsin. While the Milwaukee trade has been organized for more than fourteen years, the state dealers have never been brought together except informally. A preliminary meeting was held in Milwaukee last week attended by 100 representative dealers, to lay plans for the permanent organization. The Milwaukee Automotive Dealers' association is sponsoring the state organization movement.

The State Fair usually brings the majority of dealers from all points in Wisconsin to Milwaukee, and at least 1200 are expected to be present at the organization meeting.

STANDARD OIL TO BUILD GARAGE

Boston, Aug. 27—The Standard Oil Co. of New York has contracted to construct a garage and repair shop in Cambridge. The building will be of concrete and terra cotta, five stories 138 by 20 ft., and will cost about $250,000.

Canada's Only National Motor Exhibit Is Opened in Toronto

Automobile and Trucks Are Shown Together With Accessory and Automotive Equipment

TORONTO, Aug. 28—With three buildings devoted exclusively to it, Canada's only national motor show was opened here to-day, in conjunction with the Canadian National Exhibition, by Sir Auckland Geddes, British Ambassador to the United States. The Transportation building is given over to the passenger car show, the north demobilization armories to automotive equipment exhibits and the southern one to the motor truck displays. In all fifty-five makes of automobiles and more than a score of makes of trucks are shown. There are seventy odd accessory and automotive equipment exhibits, the displays of which represent several hundred manufacturers.

Features of 1921 Cars

Cars of the 1921 vintage are sufficiently numerous to leaven the automotive show. These superstructurally reveal an all but complete conquest by the straight-line design and a much more general adoption of plane surfaces, angles and bevel edges. They disclose also a number of improvements looking to the comfort of both driver and passenger. Outside door handles are seen on many of the makes with window straps displaced almost entirely by crank levers. Door posts of the demountable type have all but disappeared. Cowl deck or wall ventilators are the rule as are heaters.

Mechanically the new models show simplified lubrication, many makes having adopted the so-called oil-less bushings-bronze journals impregnated under heavy hydraulic pressure with graphite. Others have installed the Alemite system which displaces grease cups with little valve couplings to which a high powered grease gun is instantly attachable. Others have displaced grease cups with oil-kips. All along the line is evidenced painstaking effort to reduce the care of cars to a minimum.

The effort toward reducing truck weight in its ratio to pay load and the much more general use of truck pneumatic tires plus structural refinements and improvements are the outstanding features of the truck exhibits.

Tractors Trap "Hoppers"

DETROIT, August 25—Ford Motor Car Co. is in receipt of a letter from a Minnesota farmer regarding Fordson tractors which were used to overcome the grasshopper ravages in that country. The writer states that a trough 10 ft. long, 14 in. wide and 6 in. deep was constructed with a heavy screen, curved on the top, attached to the back of the trough and extending several inches above it. Twelve-foot scantlings nailed to this trough were attached to the front axle and the tractor sent through the field shortly before sundown when the "hoppers" settled for the night. The contraption moving through the grain, operated most successfully as a "hopper" trap and as a result the writer caught ten bushels of the pests.

One of the men who used the same device according to the letter got twenty bushels as one evening's harvest. The trough was half filled with water and a quantity of petroleum poured over the top, killing the "hoppers" as they flew against the screen and fell back into the trough.

ACROSS CANADA BY PLANE

Ottawa, Aug. 26—A trans-Canada flight, half way by seaplane and the other half by airplane, is contemplated by the Canadian air board, the effort to be made toward the end of next month, according to a statement issued by Hon. Hugh Guthrie, chairman of the board. It is proposed to make a start from Halifax, N. S., and to reach Vancouver, B. C., with stops en route at Sault Ste. Marie, Winnipeg and Calgary.

Form New Company in Canada to Manufacture Forster Car

European Influence Seen in Body Designs—To Be Made in Five Models

THE Forster, a Canadian product, has a distinctive appearance and the European influence is seen in the body designs. It has right hand drive and center control. Although it is equipped with a Westinghouse two-unit starting-lighting system, ignition is obtained from an Eisemann high-tension magneto.

The engine is a 6-cylinder, Herschell-Spillman with 3¼-in. bore and 5-in. stroke. It has a balanced crankshaft and detachable cylinder head. Gasoline is fed to the Zenith carbureter by vacuum from the main tank located at the rear. The oil pump is of the gear type, and cooling water is circulated by means of a centrifugal pump.

FORSTER SPECIFICATIONS

Engine—6-cylinder, 3¼ x 5-in.
Gearset—3 speeds forward.
Starting-Lighting—2-unit.
Ignition—High-tension magneto.
Tires—33 x 4-in.
Wheelbase—125-in.
Manufacturer—Forster Motor Car & Mfg. Co., Ltd., Montreal, Canada.

The clutch is a Borg & Beck 10-in. disk, and the gearset is a 3-speed Covert. Both front and rear axles are Timken and the final drive reduction is 4.08 to 1. The front springs are 40-in. and the rear 57-in. long—both are semi-elliptic. The wood artillery type wheels are fitted with 33 x 4-in. non-skid tires for domestic use, but for export 32 x 4-in. tires are substituted.

Standard equipment includes extra tire and rim, full quota of lamps, tools, etc.

The company which is to manufacture it has been recently formed and will be under the management of Capt. M. L. Fitzgerald.

WHERE CANADA'S NATIONAL MOTOR SHOW IS BEING HELD

On the left is seen the Transportation Building, which is given over exclusively to the passenger car exhibits of Canada's only National Motor Show held in conjunc ion with the Canadian National Exhibition. Back of this are the two demobilization armories in whch are housed respectively, the truck and automotive equipment exhibits. In the foreground are seen some of the 12,000 cars that were counted at one time when parked at the Exhibition. These bore licenses of every state in the union and every province in the Dominion

Value of Automobiles Shown by Replies to Questionnaire

N. A. C. C. Finds They Increase Business Efficiency and Prove Otherwise Beneficial

NEW YORK, Aug. 27—Replies to a questionnaire sent to 10,000 motor car owners by the National Automobile Chamber of Commerce prove that 60 per cent of the automobile mileage is commercial and that the cars have added 57 per cent to business efficiency. The questionnaire went to automobile license holders taken at random from the registration lists of California, Iowa, Massachusetts, Minnesota, Nebraska, New York, Ohio, Texas, Virginia and Wyoming.

If the average of increased efficiency which was reported were continued through the entire list of motor car owners it would mean a net gain to industry of 3,000,000 men. Farmers owning cars number 2,367,000 and the reported 68 per cent increase in rural productivity through the use of automobiles, equivalent to 1,600,000 hired men. Of the farmer car mileage, 78 per cent is for business purposes. Living conditions of 37 per cent of all the car owners questioned have been improved by the automobile and 90 per cent of all the cars are used more or less for business.

Aids Housing Problem

The replies also show that the automobile has been an important aid in the solving of the difficult housing problem. According to the facts shown by the questionnaire, 37 per cent of the country's car owners, or 2,300,000 families, are finding it possible to live in the suburbs because of the motor car. Nearly two-thirds of the owners reported that they traveled in their motors instead of by railroad or electric lines.

The passenger car has brought increased efficiency in every walk of life, but farmers are the heaviest users, with physicians and salesmen next in line. Contractors, real estate dealers, and insurance men find automobiles especially useful.

Forty per cent of the bankers who replied to the question card find the car a help in their business. A Minnesota banker reports that the car has multiplied his business efficiency "ten times." Another writes: "Car use, even for pleasure trips, gives a banker much better understanding of his customers, particularly livestock customers." A third writes of his car's use in business, "I cannot do without it."

In addition to the business use of the car comes such testimony that the owner's has had much more opportunity for education, cultural things, and healthful recreation through his automobile.

INVESTIGATE RADIATOR COMPANY

Racine, Wis., Aug. 28—The attorney general of Wisconsin has begun an exhaustive investigation of records of the Perfex Radiator Co. of Racine, Wis., in response to complaints from persons who claim to have purchased stock but have not received certificates. The affairs of the company are in the courts at Racine. It is charged that orders of the state public utilities commission relative to price charged for stock and commissions to be paid fiscal agents were ignored. The stock was placed in the hands of the Bullock-Malcolm Co., St. Paul, Minn., to be sold at $12.50 per share. It is charged that shares were sold at from $17 to $20 per share on statements that the company would declare dividends of 14 per cent. The Bullock-Malcolm Co. has declined to come into the Racine courts to show what became of all stock sold or the amount received per share.

Independent Refinery Begins Its Operations in Louisiana

Shreveport, La., Aug. 30—First gasoline went over the top from the latest independent refinery in Louisiana, Aug. 12, when the Shreveport Producing & Refining Corp. commenced operations. The company now has five wells producing in the Shreveport field, and owns its own pipe lines from these wells to the refinery here, 43 miles in length. C. D. Keen, chairman of the executive committee and in active charge of the plant, announced that gasoline refined by this company would be distributed at such a price that it can be retailed, with good profit to the retailer, at 23 cents a gallon, as compared with the 29 to 30 cents now being charged throughout the state.

STILL RATIONING GASOLINE

Seattle, August 27—With the passing of the peak of the travel season and with an augmented gasoline supply, all restrictions on the sale of gasoline in the Puget Sound district have been removed by the Shell Oil Co. Hereafter, it is announced, gasoline will be sold by the company's service stations in whatever quantities are desired.

No change has been made by the Standard Oil Co. or the Union Oil Co. The former's service stations continue to observe a close rationing basis and sales to local dealers by the Union Co. have not yet reached the normal figures originally set for the year.

NEW OIL PLANT IN CANADA

St. Boniface, Man., Aug. 27—The new oil refinery and distributing plant of the Continental Oil & Refining Co., here will be in operation shortly. Crude oil will be brought by tank cars from Texas wells and refined at the St. Boniface plant. From there it will be distributed for sale through western Canada.

TO REGULATE GAS STATIONS

Kalamazoo, Mich., Aug. 28—The city commission has passed an ordinance, effective at once, to put gasoline filling stations under license and regulation covering the sale of oil with a heavy fine and rescinding of license when there is evidence of short measures. It provides for a license fee of $12 a year.

Dealer Must Educate Public on Obligations of Contract

Cancellations in Trade a Growing Evil Unless Curbed by Firm Stand

WASHINGTON, Aug. 27—According to the findings of the Chamber of Commerce in its investigation of cancellations in trade, the growing movement in this direction is in reality the aftermath of war conditions and the responsibility for many cancellations was chargeable to the dealer as well as to the purchaser. The automobile trade organizations were included in the survey.

The analysis of replies to the questionnaires sent out to 106 leading trade associations showed that inadequate transportation was largely responsible while overstock, revision of production schedules, credit stringency and slackness in demand were contributing causes of cancellations. The survey has proved conclusively that manufacturers and dealers must undertake a campaign to educate the public into the obligations of a contract. The Chamber of Commerce believes that unless a definite stand is taken against the present tendency to regard cancellations as unimportant the evil which now confronts dealers particularly will assume alarming proportions.

PRESTON PRODUCT NOW PREMOCAR

Birmingham, Ala., Aug. 27—The new factory of the Preston Motor Corp. has been opened here. The company will manufacture three models, a small four, a six cylinder car using the Falls engine, and a special model equipped with Rochester-Deusenberg engine. Bosch magnetos are used throughout together with Timkin-Detroit axles, Borg and Beck clutch, Zenith carbureter, Bethlehem spark plugs and Firestone tires. When the Preston Motors started the manufacture of cars several months ago, the name "Preston" was used on cars and trucks but it has now been decided to change the name to "Premocar."

DEALERS VOTE BUS A NECESSITY

Louisville, Ky., Aug. 28—Building meeting of the Rochester Motor Truck Dealers' Association here, the members passed a resolution declaring the motor bus lines operating to and from Rochester to be a public necessity and promising the bus owners their support.

JORGENSON EXTENDS PLANT

Waupaca, Wis., Aug. 16—The Jorgenson Mfg. Co., Waupaca, Wis., is starting work on a large brass foundry, which is the first of a series of new plant extensions projected for quadrupling its output by the end of the year. It is a large maker of priming devices and other gas engine and automotive equipment. Among the larger orders now in execution are those from General Motors Corp. for 130,000 primers; Nash Motors Co., 30,000 primers, and Hudson and Essex, 20,000 primers.

Southern States Aiming to Co-ordinate Road Programs

Small Appropriations and Difficulty in Obtaining Material Are Hampering Work in Sections

MOBILE, ALA., Aug. 27—To discuss the subject of good roads and to formulate a plan of action to be carried out it is probable that a meeting of all automobile club and association secretaries will be held here within the next few weeks. The secretaries responding thus far to the invitation to confer signify a willingness to attend such a meeting and to co-operate to the fullest extent in bringing about a broader and more constructive plan for good road work throughout this section of the country.

Nashville, Tenn. Aug. 28—Efforts are being made to get several of the adjacent states to co-ordinate their road construction programs with that of Tennessee the feeling being that a state loses much of value unless it connects with one leading into another state. The matter is being taken up with the highway commissions of North Carolina, Mississippi, Alabama and Kentucky. The difficulty in securing road material and small appropriations for highways are said to be hampering some of this development. A bit of good news has come in the appropriation of Robertson county to help complete Dixie Highway from the Kentucky line to Ridgetop, Tenn., through the tobacco growing belt.

MONROE TO CONTINUE OPERATING

Indianapolis, Aug. 27—Receivers of the William Small Co., manufacturers of the Monroe car, have been appointed by Judge Theophilus J. Moll of the Superior Court upon application of the president, William Small. They are Reiley C. Adams, president of the Security Trust Co., and Hugh Dunning, factory manager, and will continue to operate the plant.

In his application for a receivership, Mr. Small set forth that the company owes approximately $900,000 to merchandise and bank creditors and that it has not enough quick assets to meet these obligations, although there are enough orders on the books to keep the factory busy for a long time to come.

Comparison of Price Increases in Past Two Years

Detroit, Aug. 28—The following is a comparison of price increases during the period between August 12, 1918 and August 12, 1920, with the percentage of increase as issued by a local manufacturer:

Buick 6	$530	or 42%
Cadillac 8	970	or 33%
Chandler 6	300	or 19%
Chevrolet 4	135	or 19%
Cole 8	655	or 27%
Dodge 4	300	or 30%
Dort 4	160	or 17%
Ford	200	or 44%
Franklin 6	745	or 33%
Haynes 6	805	or 43%
Hupp 4	335	or 25%
Liberty 6	500	or 34%
Maxwell	330	or 40%
Mitchel 6	400	or 30%
Nash 6	380	or 27%
Oakland 6	345	or 33%
Oldsmobile 6	255	or 20%
Paige 6	275	or 20%

Buick Dealers in Southeast Meet for Annual Conference

Service, on Account of Its Importance, Is Given Prominent Place in Program

ATLANTA, GA., Aug. 27—About 250 dealers and sales and service managers representing the Buick interests in the Southeastern territory gathered here for annual conferences held under the direction of the Southern branch of the company located in Atlanta.

The sessions were attended by the dealers in three groups and realizing the fact that service is rapidly becoming one of the deciding factors in the successful growth of the retail automobile business an important place was given to that subject on the program at all of the group meetings. Most of the dealers were accompanied to Atlanta by their sales and service managers. One of the important addresses of the series of meetings was given by Hatton B. Rogers, vice-president of the Fourth National Bank, of Atlanta, who discussed the general money situation.

Flint, Mich., Aug. 27—Buick dealers numbering one hundred fifty from the Pittsburgh district were guests this week of factory executives. The dealers came on a special train for the purpose of conferring on plans for 1921. Eighty-five new models were driven away by dealers.

COUNTY DEALERS ORGANIZE

Alexandria, S. D., Aug. 28—The Hanson County Auto Dealers and Garagemen's association has been formed by the dealers and garage proprietors and operators for betterment of business and standardization of methods.

Helping the Power Farmer to Run His Tractor

(Concluded from page 15)

give power farmers the most practical instruction in the shortest possible time.

While some of the lectures are given to the entire class of sixty at one time, most of the students are split up into small groups of four or five, each in charge of a trained teacher. If his subject is that of the functions of the engine, he will have before him an engine taken from a tractor, and with the aid of the students he will dismantle this engine and put it together again, all the while explaining in simple terms, and by identifying each particular part, the theory and practice of the engine. Questions are answered and all points not clear to any student are discussed until all doubt or ignorance is dissipated.

This same plan is followed throughout the entire course, and every unit of a tractor is taken apart and reassembled before the eyes of the students, until it becomes familiar to them. Instead of using technical language, the teachers speak in terms understood by all, and when the course is over most of the students can assemble their particular type of tractor, make the necessary adjustments and repairs, and put the machine through all the phases of farm work. In fact, the latter part of the course requires that each student shall operate a tractor in the testing field provided. Land is plowed, and the men are taught the correct way of hitching the farm implements to the tractor, and the proper depth to set the plow shares or discs.

Study Efficiency in Field

Various obstructions must be avoided or cleared, such as might be encountered in any farm field, and the men are taught to listen for and detect loosened bolts or other signs of trouble in the machine. By actual demonstration in the field, the students are taught the best method for making turns, laying out a course for plowing, harrowing or other operation, and in general, to take full charge of a tractor outfit in the field.

The course has been so well worked out that it is possible for a farmer boy, who has had no experience whatever with power machines, to attend all the sessions and come away with a fundamental knowledge of the purposes and operations of the kind of tractor he is most interested in.

Small Fee Charged

On account of the shortness of time, the men are assigned to study the particular type of machine they prefer, rather than try to learn about all of them. For instance, if a farmer owns or contemplates buying a tractor of the tracklaying type, he will be assigned to the class to study a Yuba, or a Caterpillar, or a Cleveland tractor, while one interested in the wheel machines, will work on an Avery, or a Titan, or similar model.

A nominal fee is charged each student, to cover the traveling expenses of the teachers and other necessary expenses, but most of the cost of the course is borne by the association.

The Ohmer Truck Auditor

A New Device Which Gives An Automatic Printed Record Showing Every Phase of Truck Operation

THE Ohmer Fare Register Company, of Dayton, Ohio, manufacturers of Recording Fare Registers for electric railways and Ohmer Recording Taximeters, announces its newest and what bids fair to be its most useful device, the Ohmer Truck Auditor.

The truck owner has heretofore been at a serious disadvantage. The records of his truck business have been dependent upon the lead pencil reports of his drivers and he has suffered from the consequent inaccuracy and tendency to manipulate.

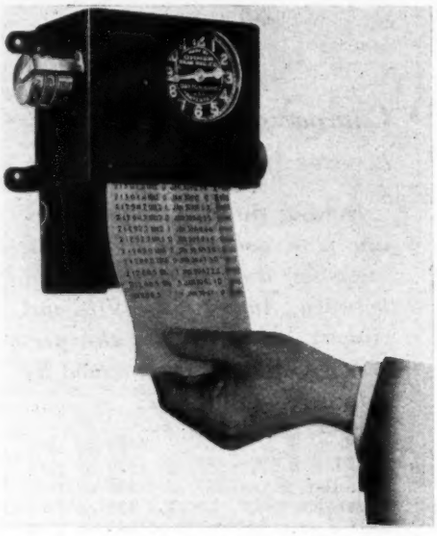
The Ohmer Truck Auditor produces printed reports of the day's work. It gives the truck owner the same sort of "mechanical supervision" as already enjoyed by the users of Ohmer Fare Registers and Ohmer Taximeters. The device is, in fact, a mechanical cost accountant, which records the expenditures for truck operation in terms of material, time and distance.

It is an instrument weighing seven pounds and very compact, placed upon the dash of the truck. It provides a complete printed report of all details of the day's work. This printed report is condensed in form, absolutely untamperable and indelible. It becomes at once a permanent office record and serves as a most accurate basis for all statistics of the business.

WHAT IT TELLS

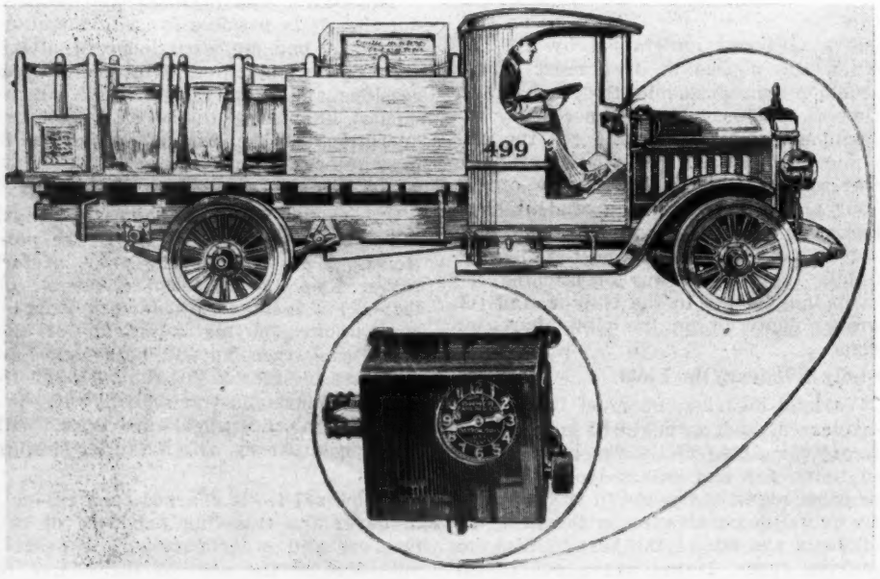
The printed report gives the following information. It tells—

Who drove the truck
The date
When the day's work began
How far the truck was driven
The time consumed by each trip
The time of each stop
Whether or not the engine was running during the stop
Mileage of each trip
Number of each trip
Weight of each load



A view of Auditor showing how the record is removed

When and how much gasoline was taken on
Time to load
When loaded
When and what tires were replaced
When repairs were made, who made them and how long it took
The average mileage per gallon of gasoline
When and how much oil was taken on
Time truck was idle
Number of trips made, and other information depending upon special requirements.



This shows the Ohmer Truck Auditor installed

As the record from the Ohmer Truck Auditor is printed mechanically, the usual human errors are eliminated. The machine does the bookkeeping for the driver, and he is permitted to give his entire attention to the truck.

THE PRINTED REPORT

Reproduced herewith is shown a report taken from an Ohmer Truck Auditor. To read this report, begin at the bottom. Each horizontal line of figures represents a statement taken at the time shown and with the mileage as recorded. Each successive statement indicates elapsed time and accrued mileage. The driver's number appears at the extreme right. The next figure, at right angles, represents the number of the Truck Auditor. Then appears the time, the date, miscellaneous data column and the mileage.

The first horizontal line of figures at the bottom tells us that driver number 192 started to work at 7 a. m. on January 30, on truck No. 499, with the mileage record at 21288.5. The next line of figures shows that at 7:10 a. m. five gallons of gasoline had been taken on at the starting point, as no change of mileage is indicated. Three pints of oil were put in the engine and the driver started for his loading point at 7:22 a. m. He went one-half mile (note advance in mileage). It took him 28 minutes to go the half-mile. This at once raises the question as to why it took him so long.

He started loading at 7:50 a. m. and finished at 8:36, having loaded two tons. He then drove 3.7 miles and began unloading at 9:14, finishing the unloading of one ton, with engine stopped, at 9:46. He drove 1.5 miles further and unloaded another ton between 10:23 and 10:53. Too long, you will have this matter also to investigate. He then drove 7.2 miles and stopped for lunch at 12:06 p. m. The truck remained idle until 12:56, when he set out for another load, arriving at the loading point at 1:36 and taking on three tons. He drove 4.6 miles in 34 minutes, when it became necessary to change a tire. Tire No. 23 was taken off and No. 34 was put on, the operation taking until 2:56, when he proceeded with his load a distance of 9.1 miles, unloaded his truck between 3:54 and 4:41 p. m. He then returned to the garage at 5:12 p. m., a distance of five miles.

METHOD OF OPERATION

Each driver is provided with an identification key. This key bears his number cut in steel type, and must be inserted in the machine before it is possible for him to take his opening statement or even to start the engine. After inserting the key he turns the knurled knob at the right and the opening statement is printed. This operation automatically releases the motive power and

the truck can be started. The letters or figures appearing in the data column are under the control of the driver who sets the proper hand dial at the left of the machine before printing the record. As the data printed in this column can be easily checked either as to time or mileage, no temptation toward falsifying is offered.

When the driver stops his truck for loading, for tire changes, engine repairs, etc., and takes his print to record that fact, the engine is automatically cut off and cannot be started again until another print is taken, showing the time consumed in the operation. The saving in gasoline thus effected will pay the cost of the device many times over. If the driver fails to stop his engine when loading, that fact is at once evident from the record.

DRIVER'S IDENTIFICATION

If the driver desires to remove his identification key for any reason, he must first print a closing statement. When the truck is again started, the opening statement as compared with the previous statement reveals the time the key was out. This gives exact information as to the extent of idle time, either during the night or when the driver leaves the truck for lunch, etc.

Practically any data required can be incorporated in the days' report by using the various characters on the data hand dial and printing wheel. A record of weather conditions even may be kept if desired.

The printed record of the Ohmer auditor

Mileage	Miscellaneous Data		Month	Day	P. P.M. A. A.M	Hour	Minute	Machine Number	Drivers Number
21320.1	IDLE	0	JAN	30	P	5	12	499	192
21315.1	UNL'D	3	JAN	30	P	4	41	499	192
21315.1	UNL'D	0	JAN	30	P	3	54	499	192
21306.0	T.ON	34	JAN	30	P	2	56	499	192
21306.0	T.OFF	23	JAN	30	P	2	10	499	192
21301.4	LOAD	3	JAN	30	P	1	36	499	192
21301.4	LOAD	0	JAN	30	P	12	56	499	192
21301.4	IDLE	0	JAN	30	P	12	56	499	192
21301.4	IDLE	0	JAN	30	P	12	6	499	192
21294.2	UNL'D	1	JAN	30	A	10	53	499	192
21294.2	UNL'D	0	JAN	30	A	10	23	499	192
21292.7	UNL'D	1	JAN	30	A	9	46	499	192
21292.7	UNL'D	0	JAN	30	A	9	14	499	192
21289.0	LOAD	2	JAN	30	A	8	36	499	192
21289.0	LOAD	0	JAN	30	A	7	50	499	192
21288.5	OIL	3	JAN	30	A	7	22	499	192
21288.5	GAS	5	JAN	30	A	7	10	499	192
21288.5		0	JAN	30	A	7	0	499	192

Miller "H" Type Carbureter

THE Miller "H" is a multiple jet expanding carbureter of the barrel throttle type. Four to six main jet tubes are used depending on the size of the carbureter, and these tubes having each the fuel jet in the bottom and four small air holes a little above are placed in a row in a removable magazine. This magazine has a fuel passage which supplies the jet in the bottom of the tubes and provides an air jacket which surrounds the main portion of each tube; these jacket spaces have a passageway near the top of the magazine above the float level that connects them with each other and with the outside air.

When not in action the tubes and surrounding air jacket spaces are filled with fuel which provides a succession of puddles as the throttle is opened and the tubes brought into action one after another. Each tube when the puddle has been drained begins to function as a miniature carbureter with fuel entering at the jet in the bottom and air being supplied through the four small air holes just above.

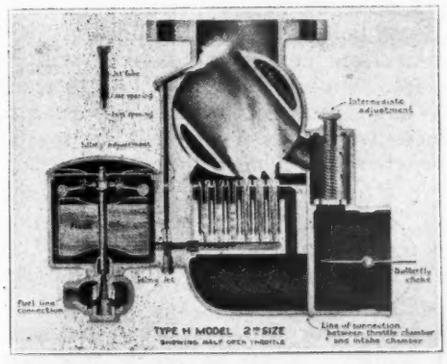
By this design the fuel goes through a "two stage" atomization process; the first in the bottom of the tubes where a heavy spray is formed, and the second in the venturi of the carbureter where the spray unites with the main air column. The main feature of this construction is the fact that the fuel flows through the jets by gravity from the float chamber and combines with the air of the first stage at a point below the float level. This brings the partially atomized fuel out of the tube and into the venturi for the second stage without the choke restriction necessary to create a depression at this point.

Two exterior adjustments are provided. The first is for idling and is a control of the idling speed air by means of a screw in the passage. The second adjustment is for intermediate speeds and has its principle effect on the first third of the throttle range.

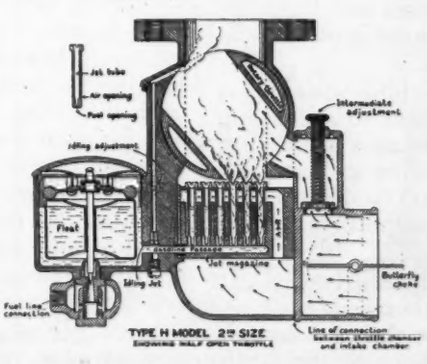
It amounts to a control of the spring tension on a poppet valve which admits a certain amount of air during the first part of the throttle opening when vacuum is at a relatively high point. This adjustment has its greatest effect as a control for pick-up, and consequently is also an adjustment for economy.

The air intake is made in two sections with an adjustable clamping ring at the joint. The second section can be supplied as a vertical elbow which can be set at any angle required for the hot air tubing. At the intake connection a butterfly valve is provided as a choker or strangler for starting; this is operated by a flexible wire control from the dash.

The carbureter herein described is the same in all respects except for the two exterior adjustments as the instrument which the Miller company have been making in large sizes only for marine and aeronautical engines during the past four years. Made by the Harry A. Miller Mfg. Co., Los Angeles, Calif.



Sectional photograph of Miller type "H" carbureter showing gas action

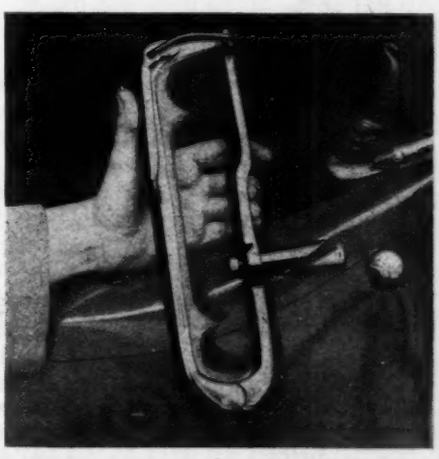


Line print of Miller showing nozzle construction

Cole Removable Bow Support

Due to the more and more popular fashion of keeping the motor car top raised at all times, the bow supports at the rear corners of the Cole Aero-Eight have been made removable. They are carried in the tool box while the top is up, a nickeled filler screw being placed in their sockets.

This gives a clean, straight sideline to the body. It will be noted from the illustration that the bow holders, when in use, are held immovably in place by a special type expanding steel plug.



Cole uses a removable bow support

A Department of BETTER BUSINESS

Conducted by Ray W. Sherman

Those Bankers

THERE isn't a thing wrong with the motor car or truck business today. The demand of the last few years is just about as strong as ever. The reason why sales are difficult in some sections is not due to the demand, but to other conditions.

One of the most important of these conditions is that of credit and finance. Bankers have spent several months in an effort to keep almost everybody from borrowing money. Their lendings had to be decreased, so they decreased them wherever they could. Inasmuch as motor cars are a large item in business, they picked on this item. If you wanted to get a lot of people to read a paper you would print it in English, because the largest number of available readers read English. Wherefore, the banker picked on the motor car because it is big.

But—much of the credit restriction on motor cars is not justified. The greatest single factor we can have today for Better Business is an earnest effort on the part of dealers to put the banker right on the motor car business. To give an example:

There is a distributor of trucks in an Eastern city whose principal occupation right now is arguing with bankers. He has a number of dealers in the territory surrounding his city, and he finds that many of the retail sales these dealers want to make are stepped on by the banker.

All sorts of excuses are given. Bankers have even told folks that they can't lend money on cars and trucks because the money must be given to the poor and impoverished railroads. Then, the railroad and big bank people say this excuse is all rot, that there is no foundation for it at all. And there you are.

The man who doesn't want to do a thing always has a variety of excuses. If you don't want to go calling with your wife some evening, you cook up some excuse and your wife hands that to the neighbors as fact. The truth is you DON'T WANT to go. You'd rather sit on the front porch in your shirt sleeves and smoke out your own mosquitoes.

The same with the banker. When he gives an excuse of this vague sort it is safe to assume it isn't so. The real excuse is as a general rule that he doesn't want to lend the money. Pin him down to the truth and you'll find his biggest reason for not holding back is a prejudice against motor vehicles. Give him all the facts you have on the essential character of the motor vehicle and sometimes he'll change his mind and come through with the necessary credit.

THE time to begin this missionary work is NOW. We're going to need credit next winter even more than we need it now, and it is poor business to wait until next winter to get the thing straightened out. Sell the banker now in the essential character of the motor vehicle. Keep at him. Make him admit the truth.

There are certain things bankers should know. Among them are these:

1—The motor vehicle is the foundation on which has been built the prosperity of every community during the last fifteen years. Cars and trucks have brought the country close to the city, permitted the development of new residential sections in cities, increased the value of all property, provided a rapid movement of people and products, and established an entirely new order of things. Stop the cars and the whole thing falls flat, and with it goes the investments of the banker and his clients in present day properties.

2—Every automotive dealer is just as much entitled to an existence as is the drygoods man or any other local merchant. Every local failure is a black eye for the community. A failure in any business hurts all business. It is the banker's duty under his charter to lend money to legitimate enterprises, and he has no right to restrict one legitimate enterprise any more than another.

3—It won't be long before financial conditions will change. When that time comes the banker will be looking for customers. He will WANT YOU to trade with him then. What reason has he in the future to ask for your business when HE needs it if he doesn't help your business when YOU need help.

Just sit down across from the banker gentleman and tell him the facts. Much of today's credit situation never would have come about if FACTS about this industry had been given to the bankers BEFORE the emergency came.

Let's get ready NOW for the next year and particularly for next winter. Keep in touch with the banker. You'll ALWAYS need him, so NEVER lose him.

Be Generous

If you possess a valuable idea don't keep it in storage where it won't do any one any good. Pass it along and add to the general comfort of the trade at large so that all may benefit. You in turn will be repaid by learning something from those you have helped. And we pay you one dollar for ideas for this Better Business Department.

You Can Make a Window as Good as This

And Here Is How To Do It

WHAT fine windows you could have if you could get the drygoods store window trimmer to set them up. But his services would be costly.

The next best thing is to study how he does it and give an imitation of him. The result will surprise you.

All you need to do is get scenery similar to his and then place large and small objects in approximately the same position he has them. For example:

On this page is a photograph of a display of little girls' clothing. It has nothing to do with accessories and supplies, yet it furnishes the plan for a supply store or garage window.

FIRST—Get a background of some kind. You should have in stock some cheap but attractive cloth for this work. Ask your wife what to get. Arrange the background in about the form shown in the photograph.

SECOND—Get a big bunch of branches or a big farm or some LARGE sylvan display piece of THE SIZE shown in the photograph. It must fill the same percentage of your window that it fills in the drygoods window.

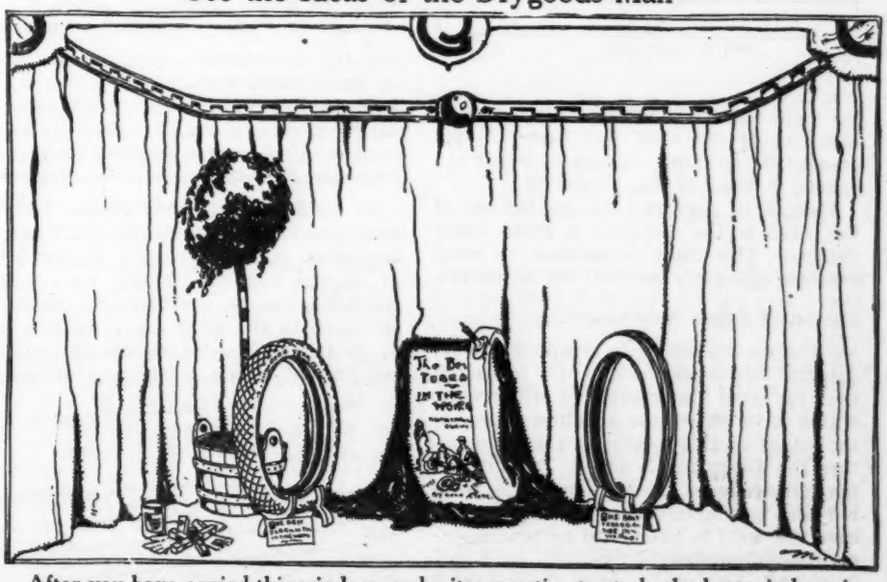
THIRD—In place of the shoes at the left front, place a pair of cotton gloves for keeping hands clean when changing tires, or a half dozen spark plugs, or any other small article from stock, using the same relative space as the shoes use in the drygoods window.

FOURTH—In place of the chair and clothes draped on it, set up a big card, as shown in the drawing herewith, over it drape a tube or two, and down the side of the card wrtie: "The best tube in the world," as illustrated. This takes the place of the chair. Height and width must be of right proportions.

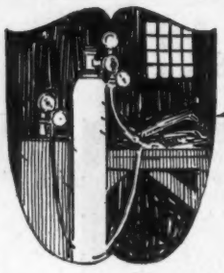
FIFTH—In place of the two girls, place tires. These would be best if stood

(*Concluded on page 35*)

Use the Ideas of the Drygoods Man



After you have copied this window, make it a practice to study the best windows in town and use the ideas in your business. Why hire an expensive window trimmer when you can do it yourself?



Autogenous Welding

What it is and how it is applied

THIS is the seventh of a series of articles on autogenous welding and describes the different types of welds. These articles are intended to be of aid to the man who must learn the art of welding with little or no personal instruction. They also are intended as a reference for the man attending a welding school. It is likely that during the first few months of his instruction many problems will come up that may be solved more readily with these articles on hand.

Finally, this series should be of benefit to any automotive service man or repairman, even though he never intends to have a welding torch in the shop. The reading of these articles will give him an understanding of the subject which should greatly aid him in general repair work. He will be better able to decide, when he has a part to repair, whether it is feasible or not to weld it, and if so, if it will pay. The more familiar one becomes with this art, the wider the scope of its application. The man who is versed in the art will find many clever applications that one who is less familiar with the subject would never dream of. An understanding of welding principles offers a new technique to the repair man.

Part VII—Types of Welds

IF the flame is not adjusted properly the resultant weld will be inferior. The most common fault is the presence of too much oxygen. Unless the welder is very careful in removing the oxide by mechanical means it will be incorporated in the weld. The oxide prevents a thorough blending of the weld and therefore decreases its strength. Types of welds are shown in Figs. 15, 16, 17 and 18.

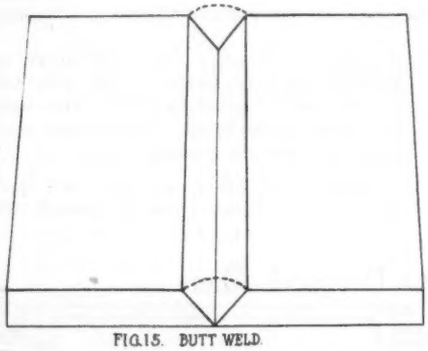


FIG.15. BUTT WELD

Failure to penetrate to the bottom of the weld is the cause of a great many defects. This fault is common to some veteran operators as well as beginners.

Fusion of Edges Necessary

Very often the desire to complete a weld rapidly will cause the operator to hasten over the most important part of the work which is to secure the absolute fusion of the edges at the bottom of the weld before the filling rod is added. This defect not only reduces the section of the weld but also produces a line of weakness in case the weld is submitted to bending or transverse strains.

When molten metal is added to metal which is not in fusion a weld is not secured. The molten metal merely sticks to the cooler metal; this defect is common with careless operators. It may be the result of improperly beveling the edges, by faulty manipulation of the blowpipe or improper use of the welding rod.

It is difficult for the beginner to distinguish the proper temperature at which to add the filling material the tendency being to add the rod before the edges of the weld are in fusion. The adhesion in this case occurs at both edges, usually, although sometimes adhesion is restricted to one side.

Oxide Film Separates Edges

If the edges of the weld are brought to a point of fusion too soon a film of oxide may form on them. Consequently, when the filling material is added, a film of oxide may separate it from the edges.

If the operator concentrates his flame on the welding rod and the edges of the weld he may inadvertently force some of the molten metal ahead where the edges are not in the proper state of fusion and consequently adhesion will be imperfect.

In welding cast iron, copper and, to some extent, steel, a common fault among beginners is the formation of blowholes or porous sections in the weld. This condition can be overcome by close observation of the work while welding and by certain corrective means, the principal one of which is the use of proper fluxes and correct manipulation of the welding rod.

Occasionally welds are produced in which dirt or some foreign material is incorporated. Porosity and an inferior weld is the result. The remedy is to remove the dirt before or during the execution of the weld.

In comparatively light work a motion is imparted to the blowpipe which will cause the incandescent cone to describe a series of overlapping circles. In order, therefore, that the finished weld be of attractive appearance these circules must be uniform and the rotation of the tip and its progress along the seam must be constant. The width of this motion is dependent upon the size of the material being welded and the nature of the material. Greater circles are required for material of high conductivity, high melting point or greater thickness.

Oscillating Movement Best

In heavier work an oscillating movement in which the tip describes a series of arcs back and forth across the seam is more economical of physical energy.

To the average beginner the regular control of these motions is difficult and considerable practice is required to master them. It is this regularity which produces the characteristic even-rippled surface of good autogenous welding. The progress of the welder and the quality of his work can be determined to some extent by the skill with which he produces this effect.

FIG.16. EDGE WELD

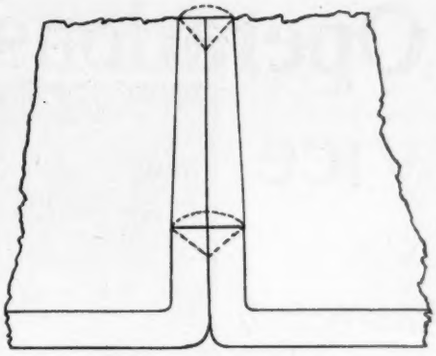


FIG 17 FLANGED WELD

Beginners should commence by welding thin strips of iron or steel ⅛ in. or less in thickness, Fig. 19. These light metals can be welded without the addition of welding material. The torch should be given a slow cross-motion with a slight forward movement. This will tend to blend the metal and reduce the liability of overheating.

Must Develop Muscular Control

Practice on this light metal should be continued for a day or two or until the operator becomes instinctively familiar with the apparatus so that he can devote his whole attention to the flow of the metal. It should be realized that muscular training is necessary in this way until complete control of the torch is obtained.

There is a strong tendency with beginners to experiment with various thicknesses of metal but they will become efficient far more quickly by mastering one kind of weld before undertaking another.

The texture of the grain in the weld may be improved by hammering. Hammering should take place only on certain metals and at definite temperatures. When done while the metal is too hot or too cold, the weld is weakened rather than strengthened but if done at the proper temperature, the strength and grain are improved. This work may be

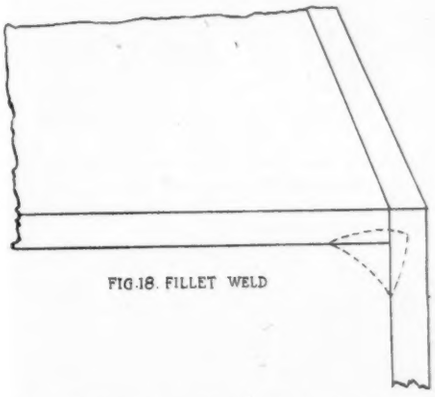


FIG 18 FILLET WELD

done while the weld is still hot from the blowpipe if care is exercised although it is better to wait until the weld is completed and then heat it to the proper temperature. Where necessary the under surface of the weld should be supported during hammering.

The manipulation of the blowpipe is important. It should be held firmly but not rigidly. The head of the blowpipe should be inclined at an angle of about 60 deg., Fig. 20. If the inclination of the head is too great the molten metal will be blown ahead of the welding zone and will adhere to the comparatively cold sides of the weld. At the same time if the welding heat is inclined too near the vertical, the preheating effect of the secondary flame is efficiently utilized. This flame must bring the metal ahead of the weld up to welding heat while the welding cone is applied to the particular point in hand. It is clear, therefore, that if the torch were placed vertically the preheating flame would not heat the metal ahead of the weld to as great an extent as if it were placed on an angle.

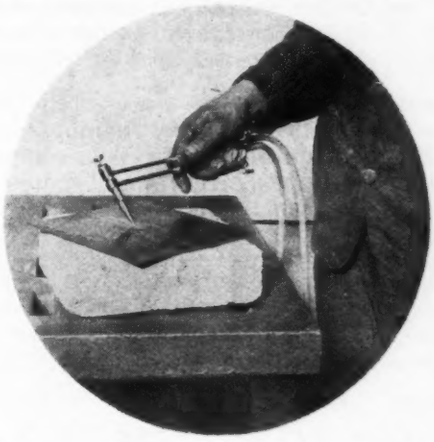


Fig. 19—On very thin sheet metal the angle of the torch should be about 45 deg., instead of the usual 60. This is done for two reasons: In the first place, a more direct impingement of the flame is likely to blow a hole through the metal. In the second place, welding should proceed with such rapidity that the full effect of the preheating flame on the metal ahead is desirable and thus, of course, is obtained by the greater angularity

Where the metal is thin or the conductivity low it may be possible to bring the head closer to the vertical than the 60 deg. recommended. Also in the case of metals which have the property of absorbing gases it may be desirable to concentrate the flame impingement to as small an area as possible.

Work Away From Operator

The motion of the blowpipe should usually be away from the welder and not toward him. Primarily this is because it is easier to see the work. In addition the blow torch is constructed to be used at a 60 deg. angle working away from the operator and so it would be awkward to increase the angle to 120 deg. if the torch were used towards the operator.

As a relief when the work is of long duration and the operator's wrist and arm become tired it is advisable to support the hose by throwing it over the shoulder. The weight of the torch is thus carried by the shoulder and can be guided by being grasped lightly in the fingers. There is a disadvantage in that the movement of the welding flame is hindered and for this reason the change is only advised as a rest.

USING THE IDEAS OF THE DRY-GOODS MAN TO TRIM YOUR WINDOWS

(*Concluded from page 33*)

in small pedestal racks, which stand the tire upright but do not intrude any large racks. Put your non-skid at one side and a plain tread at the other, or a cord and a fabric, or anything to give you two different tires. Place a small card against the bottom of each tire: "The best non-skid in the world," and "The best fabric tire in the world." Or, use any other mottoes appropriate. You can even use any other merchandise than tires so long as you GET SOMETHING OF THE RIGHT SIZE as a substitute for the little girls.

SIXTH—When you have as many pieces in your window as the drygoods man has don't put in any more, for the attractiveness of his window consists in its freedom from crowding and its clean, attractive atmosphere.

CALLS MID-CONVENTION MEETING

Chicago, Aug. 30—William Webster, commissioner of the Automotive Equipment association, is issuing a call to the board of directors, board of governors and the membership committee of the association for the mid-convention meeting to be held at the Congress hotel, Sept. 10 and 11. Preceding the meeting the committee in charge of the automo-

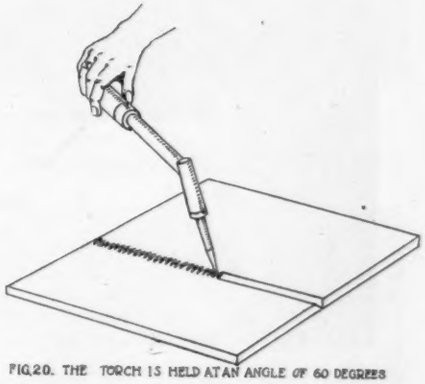


FIG 20. THE TORCH IS HELD AT AN ANGLE OF 60 DEGREES

tive equipment show at the Coliseum and annex Nov. 15-20 will confer. So many applications for display room have been received at the association's headquarters that practically all the space has been subscribed.

BUCYRUS RUBBER CO. SOLD

Bucyrus, August 27—C. M. French Rubber Co. of Cleveland has purchased the plant of the Bucyrus Rubber Co. and will start manufacturing automobile tires within sixty days. The plant has been under lease by the Henderson Tire & Rubber Co. of Columbus.

Standard Mechanical Operations in Tractor Service

by John Charles Thorpe, M.E. and Gustav Howard Radebaugh

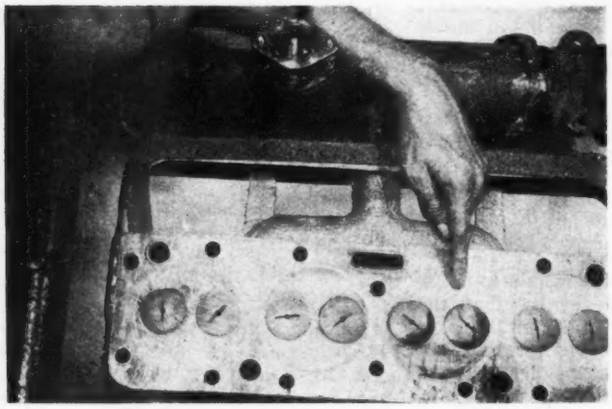
THE article herewith, while part of the series on Standard Mechanical Operations in Tractor Service, is, nevertheless, applicable to the entire field of automotive service work. Valve mechanism basically is not very much different in a tractor than motor car or truck engine, consequently what is said here applies in a large measure to any vertical cylinder internal combustion engine.

The valve mechanism of an engine is one of the prolific sources of trouble and nothing will throw an engine out of efficient running more quickly than improper functioning valves. Automotive dealers and repairmen will do well, therefore, to read and study carefully the article herewith and those that are to follow, so that mechanics might get the benefit of properly making valve repairs and adjustments.

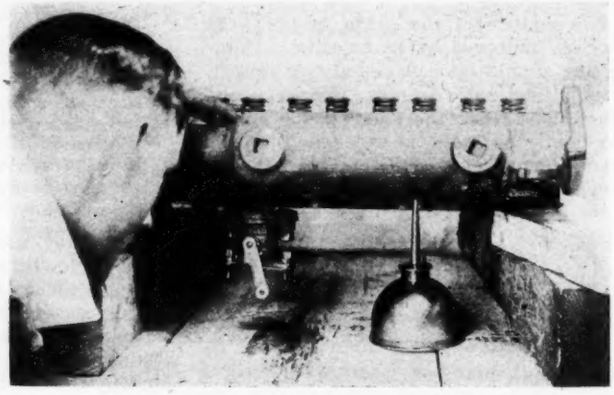
In studying this series of articles it is well to bear in mind that the authors have given much study to the question of motion and time. In other words, the operations have been worked out so that minimum effort and time is required to do the work. Often much time is wasted by mechanics doing unnecessary work on a job, which job if intelligently handled could be done in half the time.

Details of Valve Grinding Process

Continued From Last Week's Issue on the Cause and Remedy for Irregular Firing and Lack of Power



17. After letting the assembly stand for a few minutes, observe carefully, to see whether the kerosene had leaked through between any of the valves and seats

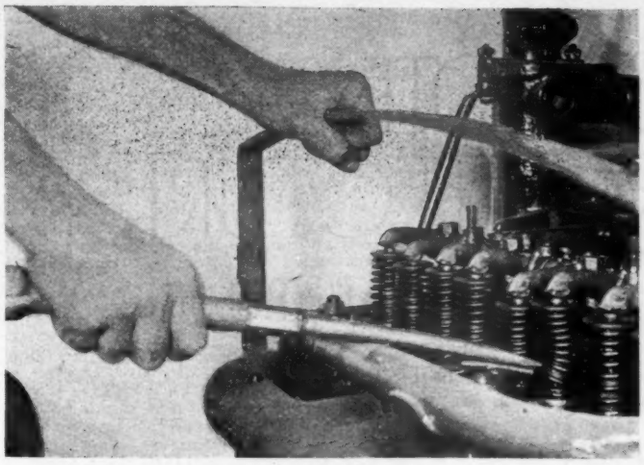


18. As is indicated in the view, kerosene leaked through valve number three, indicating that this valve needs grinding. The procedure will be the same as previously described

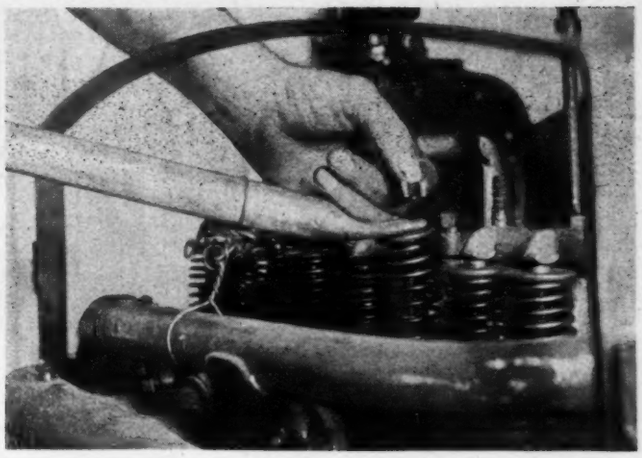
Replacing Faulty Valve Spring

Trouble—Engine fires irregularly and does not develop its power. **Cause**—Weak or broken valve spring. **Operation**—To locate and replace faulty valve spring.

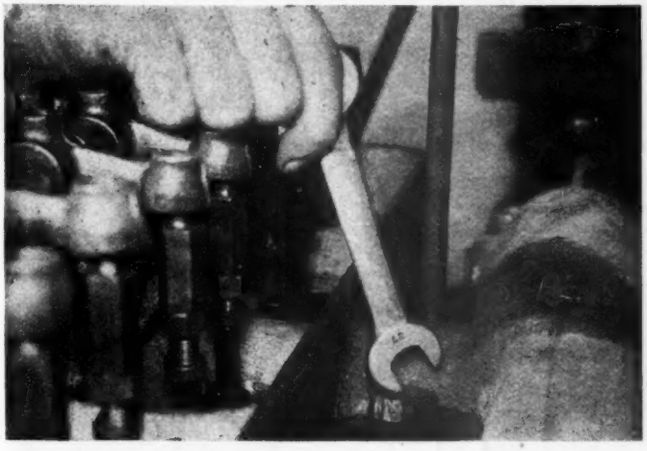
WEAK or Broken Valve Springs.—It will be seen from the character of design and operation of the valve mechanism that a broken valve spring or one that is weak would produce much the same affect as a sticky valve previously described. It is thus sometimes found that a broken or weak valve spring is responsible for the engine firing irregularly and failing to develop its power. The reason for the spring being weak or broken may ordinarily be traced to an error in the heat treatment or tempering of the steel of which the spring is made, or to an inherent fault in the material itself which cannot be detected by the regular inspection. In some instances the spring may take a permanent "set" due to an unusual strain brought upon it by having its freedom of action restricted by a sticky or warped valve. This would have the same affect as if the material or tempering were at fault.



1—After removing the valve cover, a broken valve spring may be noted by inspection. To locate a weak spring with the engine running, insert a screwdriver between the coils of the springs, beginning on cylinder number one and following up consecutively. Apply pressure upward or toward the retainer end of the springs. The weak spring is located when the application of the pressure improves the operation

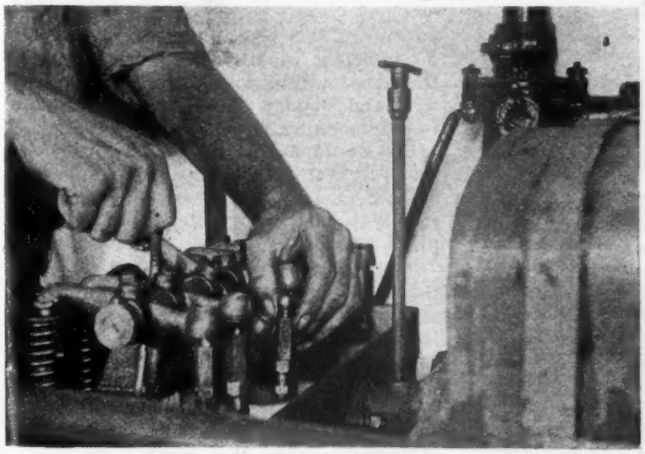


4—Using a forked tool made of a piece of pipe flattened on the end with an opening or slot of a size to fit closely around the valve stem, compress the spring and remove the split washer from the valve retainer. The fulcrum for this lever action may be made by using a piece of baling wire looped around the manifold as indicated in the view

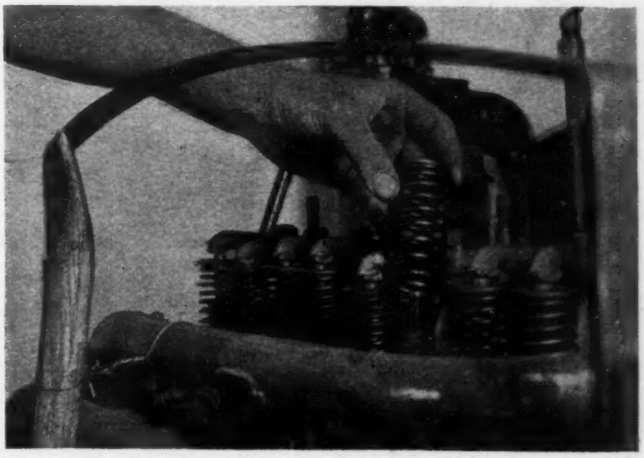


2—Loosen the adjusting nut on the valve tappet with open end wrench provided in tool kit. The operator's finger is seen pointing to the adjusting nut in the view

5—The rocker arm may now be tipped back and the faulty spring removed. In the view the operator is shown removing a broken spring

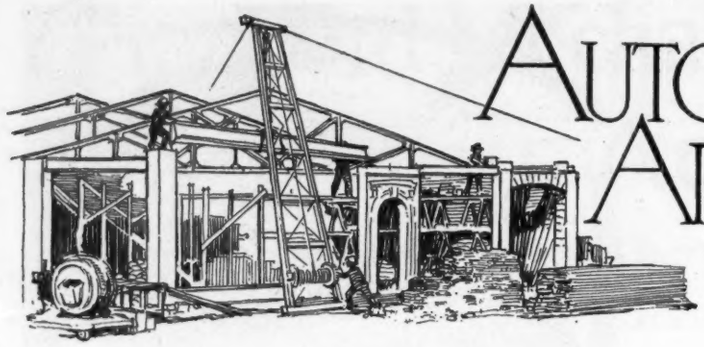


3—Screw down the adjusting nut so that the tappet will permit the rocker arm to pass. This will be found necessary in order to free the valve end of the rocker and permit the removal of the spring



6—Put new spring in place. In some instances tapered springs are used and in this case the operator must be sure that the spring is going in right side up. If the spring is cylindrical there is no difference in the ends

The operations in replacing a weak or broken valve spring will be concluded next week



AUTOMOTIVE ARCHITECTURE

Planning and Building Problems

CONDUCTED BY TOM WILDER

No. 263

PROBLEM IN FRONT ENTRANCE

Q—I have four 25x140 ft. lots fronting on the west and on which I intend to erect a brick garage, an annex and a filling station. My office is on the north lot and it is on the rear of this lot that I wish to build the annex. The south lot is separated from the others by two 25 ft. vacant lots. It is on this lot I have planned to have the filling station with a driveway extending across the west end of the vacant lot referred to.

I would like two entrances in front of the garage, one in the rear and one directly across from the filling station. The side walls are to be at least 10 ft. and the front finished in white enameled brick, with large plate glass windows. I understand that due to the scarcity and the price of the plate glass in large sizes, panel plate glass fronts are being used to good effect.

The garage is intended mostly for repair work and storage, but I would like ample show space for new cars, etc.—Leslie Baskin, Hereford, Texas.

We do not just understand about your office which you say is on the front part of the lot where your shop is to be. If it is to be connected to the garage you will probably not need any other office but if you want another office for the garage, then it will be necessary to cut off a section of the show room for that purpose. If you want to retain the large show room the space could be taken from the garage as indicated by line A.

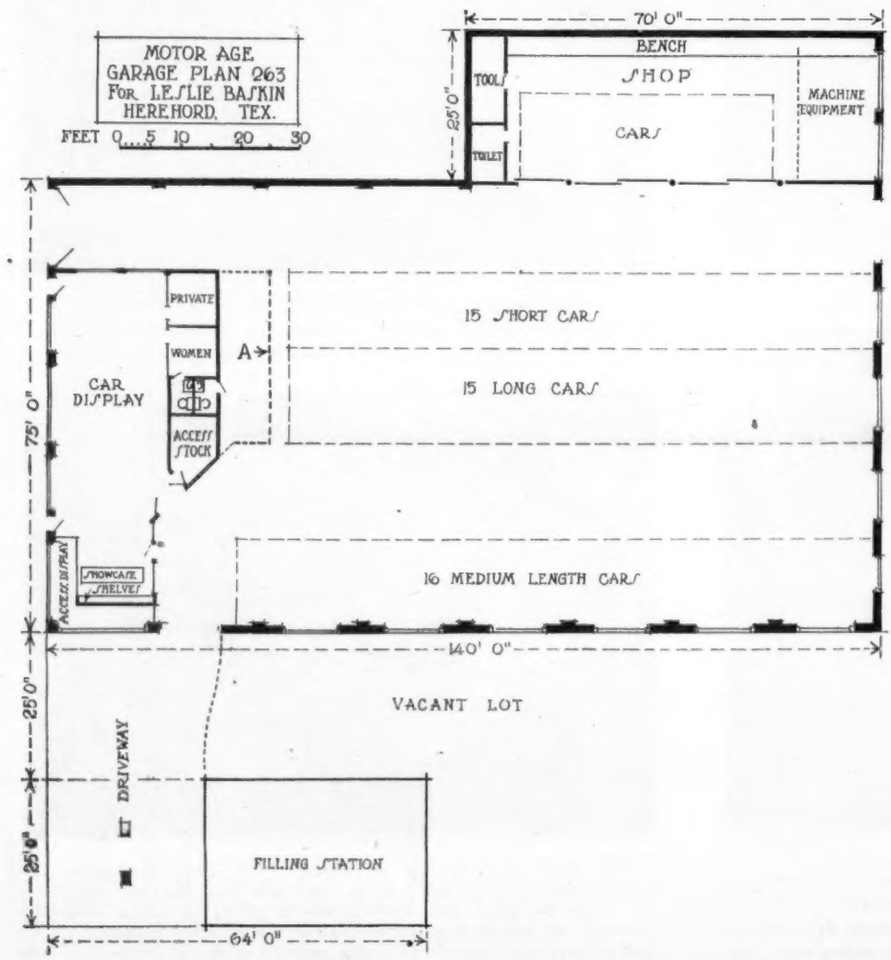
Since you have an entrance from the filling station, there should not be more than one other entrance in front. In a garage of this size, one entrance would be sufficient for all actual needs. More than that would waste space and frontage, and display space is too valuable to waste on extra entrances.

We would advise taking advantage of the filling station by installing an elaborate accessory display on that side. In this way you can make many sales to filling station customers.

The width of your building is such that rows of cars will crowd your aisle space pretty badly, but by segregating them according to length as we show in plan, you can gain the maximum space between the rows.

You had better make your wall 11 or 12 ft. high. Ten foot is hardly enough clearance under the trusses for good appearance though it would actually accommodate most any truck.

The plate glass situation will probably be improved before you are ready to glaze your front windows. If possible, we would use the large glass.



No. 263—Using filling station to draw attention to accessory stock

In this department MOTOR AGE aims to assist its readers in their problem of planning, building and equipping service stations, garages, dealers' establishments, shops, filling stations and in fact any buildings necessary to automotive activity.

When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

No. 264

UTILIZING WALLS OF A BURNED BUILDING

We are submitting to you a sketch of a burned building site on a 100 by 106 ft. lot. The heavy lines are brick wall, the double lines are foundation and retainer walls and the dotted lines are boundary property lines. We wish to build a Ford service station as we have the agency for the Ford car and the Fordson tractor.

We will carry a line of tires and accessories having a prominent display room for accessories in front of the building. We desire a salesroom, large enough to display three Ford cars; a general and private office; a women's rest room; a battery department; a stockroom for parts and storage space for about thirty or thirty-five cars.

We have the regular Ford shop equipment with which to fit out our shop and we will employ seven men.—Eley Motor Co., Union Springs, Ala.

In laying out a plan of this kind, it is generally found impractical to depend very much on old walls and foundations. Walls are usually weakened so much by falling timbers and uneven expansion during a fire that it is not judicious to build much on them or to do much cutting away or patching. It is considered better by many, unless a wall is just right, to raze it completely, clean the brick with cheap labor and start anew, using all the old material that is worth using.

In disposing of the back section which is five feet below grade, perhaps you could excavate a part of it for a basement oil storage room, using the excavated material to fill the balance of the space.

The line between the shop and garage could be a partition or not as desired, but the capacity of the shop would be more flexible without it. Also cars could be run into the shop from the garage section without interfering with any operations going on in the shop.

You do not mention any special shop or equipment for the Fordson end of your service or salesroom, so we presume you intend running them together.

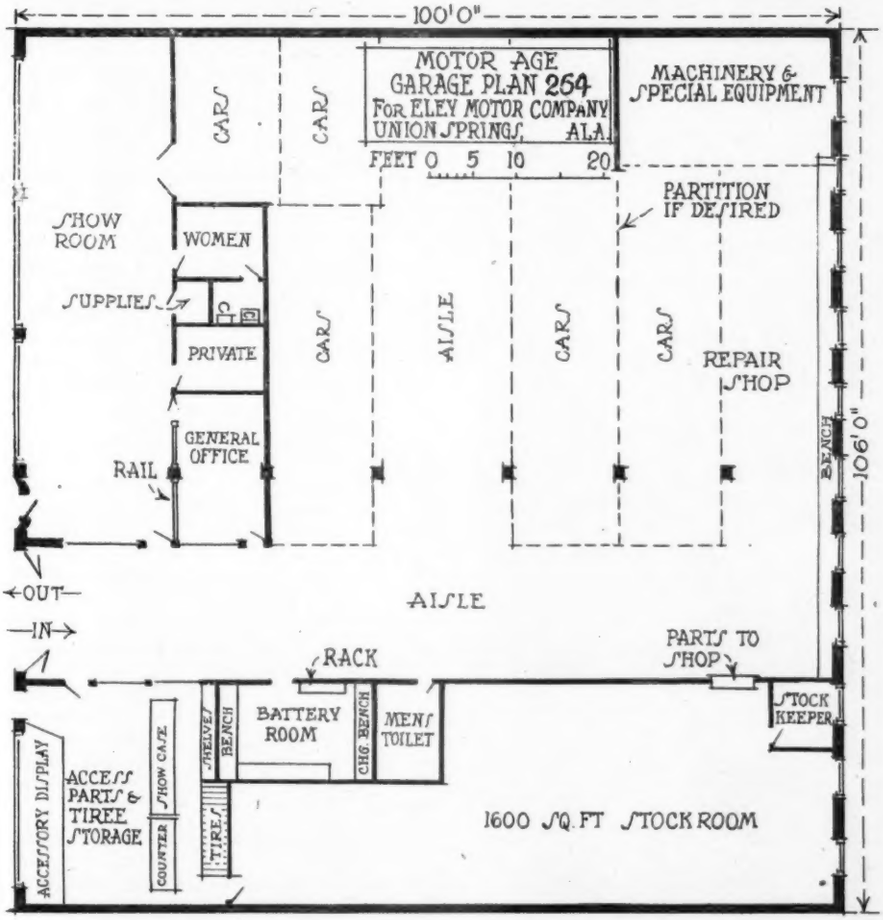


Fig. 264. Utilizing walls of a burned building

ARRANGE OHIO CONVENTION

Cincinnati, Ohio, Aug. 28—E. J. Shover, Secretary-Manager of the Ohio Automotive Trades Association, conferred here this week with members of the local association on plans for the State convention in Cincinnati in December. It is expected that at least 2,000 delegates will be present. Personnel of the various committees to be named for the convention will be announced within a week or two, when the Executive Committee makes the appointments. Arrangements are being made to have several speakers of national reputation address the convention.

Planning a Tire Service Station

(*Concluded from page 13.*)

who, with irons, hammer and screwdrivers, forces off the tire in anything but a business-like way. The customer is forced to wait, when the job of removing the tire could have been done in a few seconds with a tire changing machine. These machines not only do the job much quicker and better, but leave a lasting impression on the customer when he sees the work done in this manner and loses little or no time waiting.

The same thing holds true when a customer comes in for his repaired tire. He may want the tube inserted and the tire put on the rim. The sooner you can get this job done for him the better satisfied he will be and is sure to come back the next time he needs anything in this line.

Standardize Tire Business

Tire repairing is a business which it is possible to standardize to a great extent. The different repairs on a tire can be classified and the shop arranged accordingly, so that no false moves need be made. In other words, the tire repairing can be put on a production basis. A blow-out repair is much the same on one tire as on another; similarly, a treatment for a rim-cut will be the same, repairs on a tube, etc. With this in mind the layout shown herewith can be followed and good results assured. It will prevent cluttering up the shop and with a place for everything and everything in its place there is little change for anything to go wrong.

The ground plan shows a gate between the finished tube rack and the showcase, which, while it will keep customers out of shop, allows them to look into the latter. The manager's desk is just behind the door, where he can handle the necessary accounting, attend to incoming and outgoing work and also take care of sales from the showcase. If space permits it would be an excellent idea to arrange for a sort of rest room for customers. All you need is a rug, two or three chairs, a table, some magazines, etc. Too many of our tire service stations have been little more than holes in the wall and are anything but inviting.

Layout for Repairing Only

The layout of the service station shown herewith is intended for a one-story building, or where the business is done on one floor. We have assumed the place is to be devoted entirely to the repairing of tires. Thus no new stock would be carried and sales would be confined only to accessories like tire talc, patches, pressure gages, etc. Later we shall take up the methods of conducting a tire service station wherein new tires and tubes are sold in addition to doing repair work.

The Readers' Clearing House

Questions and Answers

CONDUCTED BY ROY E. BERG
Technical Editor Motor Age

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by some one else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

FRONT WHEEL BRAKES

Q—PUBLISH design with drawings, if possible of the front wheel brakes used on Resta's Peugeot.

2—Publish design used on the Hispano Suiza.—J. S. Langford, Kansas City, Mo.

The front wheel brakes used on Resta's Peugeot are not available but they are very similar to the brake illustrated in answer to the question beow.

2—Figs. 1 and 2 show two views of four wheel brakes developed by Engineer Perrot, a European designer, who has worked out the braking system employed on many European cars.

STOCK CAR RECORD

Q—What is the fastest stock car made in America? Cunningham?

2—What is the guaranteed speed of the new Winton? Mercer raceabout? Stutz bearcat? Re Vere, F. R. Porter and Biddle roadsters? Hudson speedster?—Winston C. Barker, Cadillac Motor Car Co., New Bedford, Mass.

1—Cunningham. This car was driven by Ralph De Palma on the Sheepshead Bay track and established the following records:

6 miles	3:37:8
8 miles	5:16:6
10 miles	6:35:4

The fastest 2 mile lap was made in 1:18:4 or at a speed of 99.5 miles per hour.

2—Some of the companies mentioned are making guarantees but we have no information concerning their guarantees at the present time. The proper thing to do is consult one of their dealers or write to the factory direct.

CAR SPEEDS

Q—What is the maximum speed of a Marmon 34 with gear ratio of 4 to 1 and a Hudson speedster with standard gear?

2—Give the revolutions per minute of the Mercer Series 5, Essex, Stutz and Buick.—H. B. Martin, Chandler Motor and Supply Co., Greenwood, S. C.

1—The maximum speed of these cars is not recorded officially and therefore any statement that we make is merely an approximation. Both of these cars ought to make from 70 to 75 miles per hour.

2—Mercer, 2800; Essex, 2800; Stutz, not available; Buick, not available.

REGAL REAR AXLE ADJUSTMENT

Q—Instruct how to take up the ring gear in a Regal standard 4 1916 model.

2—Is there a rear universal in this car? Publish illustration.

3—How much play would there have to be between the cylinder walls and piston 3¾ in. to require lapping in new pistons?

4—Should the front wheels pitch in at the bottom? If so, how much? The car steers hard and I tried a plumb on the wheels and they are perfectly straight up and down. If the wheels were slanted in at the bottom would the car stear more easily?—Frank J. Norris, Detroit.

Miscellaneous

1—In making an adjustment of the ring gear it will also be necessary to make an adjustment of the pinion gear. The drive pinion can be moved forward or backward by screwing the threaded sleeve which contains the roller and thrust bearing in the casting at the rear end of the propeller tube. This threaded sleeve is held from turning by the small plate fastened to the casting directly over the bearing. This plate has a long tongue or projection which extends down and engages in a notch in the end of the threaded sleeve. The sleeve is notched around its complete circumference so as to permit locking the sleeve in any position. When this locking plate is removed the threaded sleeve can be turned with the aid of a screwdriver or long punch. Screwing the threaded sleeve to the right or back towards the differential will move the drive pinion into closer mesh with the ring gear.

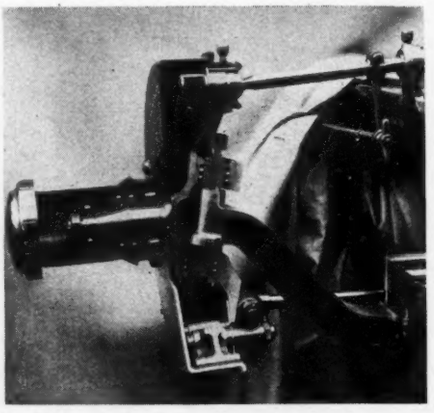


Fig. 1—Delage front wheel brakes and steering pivots

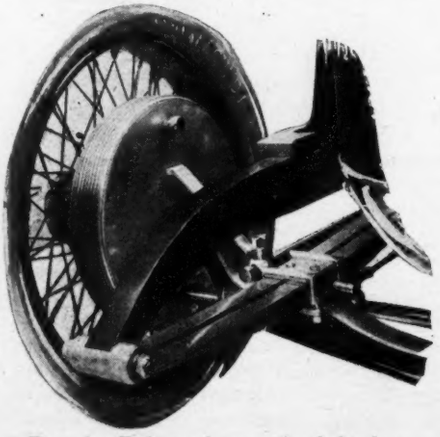


Fig. 2—Delage front wheel brakes

Screwing the threaded sleeve to the left or away from the differential will increase the clearance between the pinion and ring gear. Either too tight or too loose an adjustment between the pinion and ring gear will cause them to grind. The ends of the teeth of the pinion and ring gear should be practically flush in order for the gears to run smoothly. After making this adjustment always replace the locking plate for if this is not done, the threaded sleeve is quite apt to turn with the pinion shaft and spoil the adjustment.

The cups or sleeves, in which the differential bearings are contained, are threaded on the outside and rest in corresponding threads in the differential supports and in the bearing caps. By slightly loosening the nuts which clamp the caps in place, the threaded bearing cups or sleeves can be turned to the right or left as may be required in order to move the complete differential and ring gear into proper alignment with the drive pinion. After making this adjustment securely tighten the nuts on the bearing cap studs and replace the cotter pins; also replace the locks which prevent the threaded cups from turning.

2—There is no illustration available but one universal joint was used in the driving mechanism and this is contained in a dust proof casing located at the center cross member of the frame.

3—There is some question as to exactly how much wear will make it necessary to lap in new pistons. However, it somewhat depended upon compression whether or not the pistons are pumping oil. In case the cylinder shows excessive and there is a decided loss of compression we advise having the cylinders reground and over sized pistons and rings fitted.

4—The front wheels should toe in

about one-quarter of an inch; that is, there should be that much more distance between the felloes at the back and in the front, when measured at the height of the spindle. If the front wheels are found to be out of the proper alignment it will be necessary to disconnect the front axle steering rod from the left steering knuckle and shortening or lengthening the rod as may be required by loosening the pinch bolt in the adjustable yoke and screwing the yoke to the right or left. After testing the alignment, if the steering continues to act stiff and bind it may be due to lack of lubrication at the various joints or perhaps the joints are worn and it is quite possible that the rods may have been bent.

SIMONIZING

Q—Give us the system of the Simonizing of autmobiles as we wish to add this service to our business. What is the material used and where may we obtain it and is there any particular skill necessary to do the work satisfactorily?—B. K. Hayhurst, Lowell Battery Service Station, Lowell, Ind.

This system of polishing bodies consists of a cleaning solution and a finishing compound of a waxy nature. This process is not difficult to employ and it gives very satisfactory results. Full details can be obtained from the Simons Mfg. Co., 2121 Michigan Ave., Chicago.

Carburetion

CHEVROLET CARBURETER

Q—When the accelerator on a Chevrolet 490 is opened all the way, suddenly, the engine dies and if accelerator is brought back to a slow idling the engine will run again. This is experienced more times on a pull and if the choker is used it overcomes this trouble. This only occurs at intervals. The engine will at times idle very slow but the pickup was never good. The car only makes about 35 m.p.h. on high. The valves have been ground, new points were put in the distributer and also a new idling tube in the Zenith carbureter. On low and second gears it runs good. The spark plug points are set at .031 in. and the distributer breaker points set at .014 in.—Henry H. Reiser, Jr., St. Louis, Mo.

1—The fact that the car will operate satisfactorily when the choke is pulled out indicates that the mixture is too weak. It may work alright after the engine is hot and at high speeds but it will not give good acceleration. This is due to the fact that the mixture is so lean that when the throttle is opened suddenly the in-rush of air is so great that the mixture becomes still leaner and it is impossible to get good acceleration. To overcome this trouble will require very careful adjustment of the carbureter. There are but two adjustments provided. These are provided to properly idle the engine. With the average carbureter, if maximum speed is desired proper idling at low speed is sacrificed or vice versa. By means of admitting more or less air, however, through the small slow speed adjusting screws the carbureter will idle without choking or loping and yet, the maximum speed can be obtained providing, of course, that the main jet, compensator and choke tube are the proper size. If you find that it is impossible to get satisfactory operation by proper adjustment we advise taking the matter up with the carbureter to determine if the jet, compensator and choke tube are the right size. See Fig. 3.

TO assist readers in obtaining as a unit all information on a certain subject, MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

Miscellaneous

J. S. Langford.....Kansas City, Mo.
Winston C. Barker, Cadillac Motor Car Co. .....New Bedford, Mass.
H .B. Martin, Chandler Motor and Supply Co. .....Greenwood, S. C.
Frank J. Norris.....Detroit
B. K. Hayhurst, Lowell Battery Service Station .....Lowell, Ind.

Carburetion

Henry H. Reiser, Jr.....St. Louis, Mo.
H. Temple Deamon.....Marble Cliff, Ohio

The Electric System

Phillip J. Kenny.....New York City
C. E. Sharpe, Audrian Service Garage .....Mexico, Mo.
Mauric G. Davis, Auto Electric Service Co. .....Pawhauska, Okla.
Ole Graff.....Mekinock, N. Dak.
D. H. Bunson.....East Liberty, Pa.
H. E. Knies.....White Haven, Pa.
G. M. Newnart.....Carlisle, Ark.
Henry H. Reiser, Jr.....St. Louis, Mo.
H. G. Wenke.....Hot Springs, S. Dak.
Kellogg Garage Co.....Kellogg, Idaho
Motor Inn .....Finlayson, Minn.
Phil H. Bate, Foreman Service Department, McNeel Auto Co., Marietta, Ga.

Rebuilding

C. H. Lampe.....Kansas City, Mo.

Engines

Lawrence A. Caldarello....Kansas City, Mo.
Alois A. Pimper.....West Point, Neb.
C. V. King.....Vernon, Tex.
Wm. Dool.....Syracuse, N. Y.

CARBURETER TROUBLE

Q—A 1918 Willys-Knight equipped with a Zenith carbureter spits back at 40 m.p.h., misses and is hard to start. The ignition is good but on climbing a hill the engine died in second, although the accelerator was wide open. Is this due to an old carbureter? Would a new model remedy the trouble? The gas line was renewed this year, also the pipes.

2—While trying to start the engine the compression blew water out of the engine with such force that it covered the windshield. Could not find where it came from but am sure it was water. Is there a leak in the cylinders?—H. Temple Deamon, Marble Cliff, Ohio.

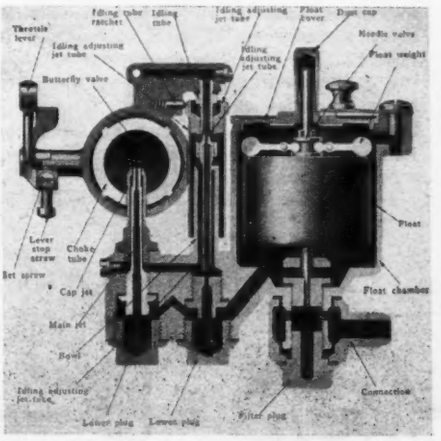


Fig. 3—Sectional view of Zenith carbureter

1—This may be due to a lean setting of the carbureter or it is possible that the jet sizes are wrong. This popping back is more apt to be a result of leaky valves or manifold. We will give a case where missing occurred whenever the car reached a speed of 19 miles per hour. Every possible carbureter setting was made and tests made for all of the common troubles but the trouble still existed.

Accidentally a little oil was dropped on the manifold and immediately bubbles appeared. Upon examination it was found that the intake manifold casting had developed a number of very fine holes and it was not until the car attained a certain speed that the air was sucked in and caused missing. However, if the main jet is too small, the mixture will be too lean at high speed and backfiring may occur. If after making all of the tests possible you find that the carbureter is at fault we advise writing the factory to obtain advice regarding the jet sizes.

There is a possibility that the trouble is in the vacuum tank. When you have definitely determined that the tank is at fault, which can be done by supplying a gravity feed to the carbureter direct, first examine the screen just below the inlet pipe from the main gasoline tank. This screen is designed to catch impurities which may be carried through with the gasoline and will occasionally become clogged.

To remove this screen, first remove the bushing around the pipe from the main gasoline tank. In case the inner valve leaks, the inner shell may be taken out by removing eight screws at the top of the tank. The tank may then be used as an ordinary gravity system. Between the head and the tank is a gasket. This gasket is shellaced, and in removing the head, use care to prevent damaging the gasket.

The flapper valve sometimes accumulates a black carbon coating, which may prevent it from seating properly. In this case the valve should be rubbed flat on a piece of sandpaper or emery cloth, or scraped carefully with a knife.

2—This engine is provided with a removable cylinder head and it is possible that the water, which may have been formed through condensation, was forced through the gasket when on the compression. However, if this is the case, the engine would have a great loss of compression and very bad missing accompanied by loss of power would result.

ZENITH CARBURETER ADJUSTMENT

Q—Publish a picture of the Zenith carbureter used on the model N Hupmobile engine and show adjustments.

To increase or decrease the richness of the mixture close the hand throttle and turn the knurled nut beside the float chamber, until the engine runs smoothly. Turning the nut to the right decreases the amount of air, and turning it to the left increases the amount of air.

The Electric System

MAGNETO ADJUSTMENTS

Q—Instruct how to adjust and set the Dixie magneto.

2—Instruct how to set the valves on a gasoline engine for power and how to set them for speed.

3—What is the limit for early and late setting valves, also ignition?

4—If one side breaker point opens wider than gage in Bosch magneto, will it make the engine hard to start? What is the cause and give remedy.—Phillip J. Kenny, New York City.

1—To time this magneto to the engine: Place the piston on the top of the compression stroke. Uncouple the magneto. Place the breaker in the retarded position. Rotate the drive shaft of the magneto in the direction it is driven until the points are about to open. Couple the magneto and connect the distributer terminals to the proper spark plugs in the firing order.

The standard setting of the breaker points is .020 in. just as the points are breaking. Positioning of the breaker or interrupter box can be accomplished by set screws around the cam, so that the break can be made to occur without disturbing the adjustment of the points.

2—For operation at very low speed, the inlet valve should begin to open and should close at the beginning and end of the inlet stroke respectively, and the exhaust valve should open a trifle before the end of the power stroke and close at the end of the exhaust stroke. However, in order that the engine may operate satisfactorily at high speed, it is necessary to alter the valve periods considerably. The exhaust valve must open earlier and close later, and the inlet valve must open later, in order not to overlap the exhaust opening, and close later. If an engine is timed to give the best results at high speed it will not run so satisfactorily at low speed and will not be as flexible. This is due to the fact that when the exhaust valve opens very early, some of the power otherwise available is lost through the exhaust, and when the inlet valve closes very late, some of the charge drawn in during the suction stroke will be forced out again during the beginning of the compression stroke. The cylinder, therefore, will not receive a full charge and will not utilize to the fullest advantage the charge that it does receive.

3—Tests on a Renault engine show that as the inlet valve is set to close later, the power for a given speed of rotation increases until a lag of 60 deg. is reached. When the inlet valve is still further increased to 90 deg., the power diminishes, but the diminution of power becomes less as the speed of the engine increases, and for very high speed such a lag would seem to give an increase in power. The angular speed corresponding to the maximum power is greater the later the inlet valve closes. With ignition timing the spark can be advanced just as far as possible without producing a serious knock.

4—Yes, the breaker points should be set so that the maximum break is .015 to .020 in. or about 1/64 in. It would be advisable to examine the spark plug gaps as well. This setting should be about .025 in.

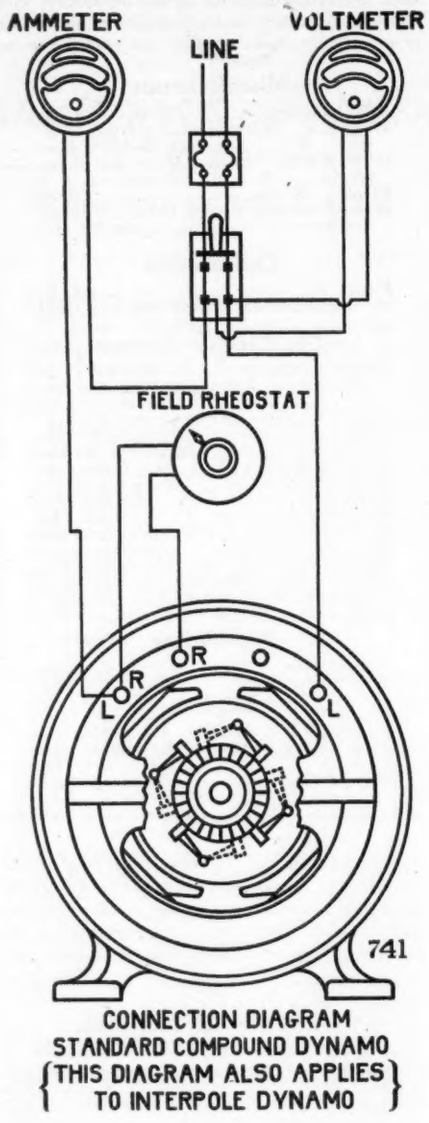


Fig. 5—Wiring diagram of the Robbins and Meyers generator

STARTER TROUBLE

Q—Would it be possible for an Olds 8 model 45-A 1918 to stop on dead center and prevent the starter from turning the engine over? One particular customer who has this car has been having trouble with his engine failing to turn over and when this happens it is necessary to use a crank and dislodge the starter gear.—C. E. Sharpe, Audrian Service Garage, Mexico, Missouri.

There are several possible causes for this action. It is not a case of the engine being on dead center but is an electrical trouble entirely. The first thing to do is to test the battery as a weak battery will often cause this trouble. Failure to start may be caused by any of the following: switch contacts defective, sticking clutch, armature shaft out of alignment, bearings in the generator defective, poor brush contact, loose dirty connection, ground or short circuit. After testing the battery we advise examining the brushes and commutator to see that good contact is being made. If you find after going over the electrical circuit carefully that the trouble still exists examine the clutch to see if it is sticking due perhaps to sticky, dirty grease.

GENERATOR LOSES MAGNETISM

Q—Does a Remy generator, or any other generator for that matter, ever lose its residual magnetism? We have had two or three Remy generators of late where no trouble of any kind could be detected either in the windings or armature, yet the generator would not generate until a battery was placed in series with the generator and the cutout points pulled together. The generator would then generate until the engine stopped or slowed down sufficiently for the cutout points to open, when it would cease to operate again. You might naturally assume this to be in the cutout, but we wired around the cutout and in one instance a new cutout was installed but without results.—Maurice G. Davis, Auto Electric Service Co., Pawhuska, Okla.

1—Any generator if left unused, will eventually lose its residual magnetism. The better the quality of iron in its fields, the more likely is this to happen. In ordinary use, where a generator is used intermittently, it is extremely unlikely that it will lose its residual magnetism between periods of usage, if the periods be relatively short.

Wherever a particular generator is found to lose its magnetism habitually, this generally indicates that there is something wrong with the wiring arrangements whereby the fields are actually demagnetized by a battery, or

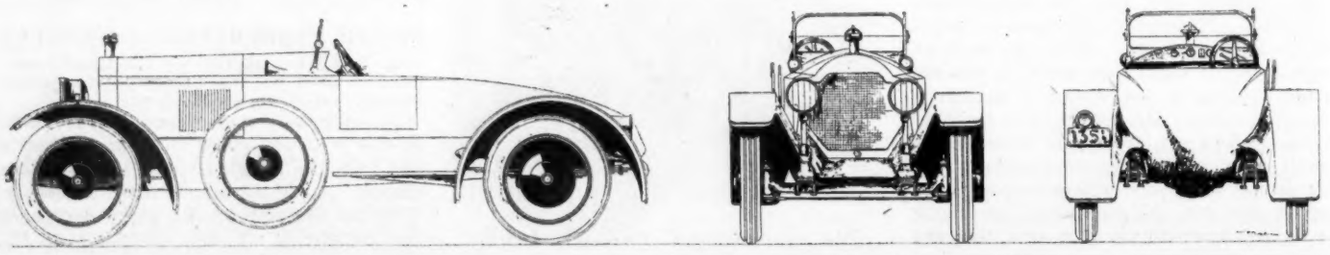


Fig. 4—Side, front and rear elevations for suggested Packard Speedster

other source of electricity during a period of rest.

In the case of the Remy generator, it is probable that the relay is so adjusted that when the generator is shut down it permits a reverse current to pass through the fields, thus demagnetizing them. The adjustment of the relay should be examined carefully, as well as the wiring to the battery to insure against this.

GENERATOR CONNECTIONS

Q—How is a Robbins and Myers generator of a 2 K. W. with terminals Pos.-Neg.-R connected to a rheostat? Where do light wires attach to rheostat?—Ole Graff, Mekinock, N. Dak.

The Robbins and Myers generator is a compound wound machine. The proper connections to the field rheostat and the line wires are shown in Fig. 5. The leads on this generator are not marked positive and negative but they are marked looking at the commutator end and reading from left to right L and A, R and L. The two outside binding posts are for the line wires and the posts marked R are for connection to the field rheostat.

AMMETER INSTALLATION

Q—Publish wiring diagram of the 1914 Oakland 48 Delco system showing ammeter installation.—D. H. Bunson, East Liberty, Pa.

A type of ammeter like the P. V. Universal model made by the Roller Smith Company is recommended for this. Diagram is shown in Fig. 6.

ENGINE STARTS HARD

Q—Since a 1909 model 17 Winton 6 was equipped with a Bosch high tension magneto we have had trouble starting it. It back-fires and is hard to start, but once started it runs all right. This car is equipped with an air starter which now seldom starts it, but when the Eisemann dual system was used it seldom failed to start. Is there any way in which this difficulty in starting can be overcome? Is there any way in which a battery could be connected to this magneto so as to make starting easier?—H. E. Knies, White Haven, Pa.

The fact that it is hard to start may be attributed to other things beside magneto trouble. If after checking carefully you find that the hard starting is due to ignition trouble, first examine the spark plug gaps and see that they are set .025 in. Next see that the breaker points are set with the proper gap.

Fig. 7 shows the standard wiring of the dual system. If this system is wired and adjusted correctly there is no reason why it should not start easily. It is advisable to open the throttle when shutting off the ignition so that the cylinders will contain a charge which will assist greatly in starting.

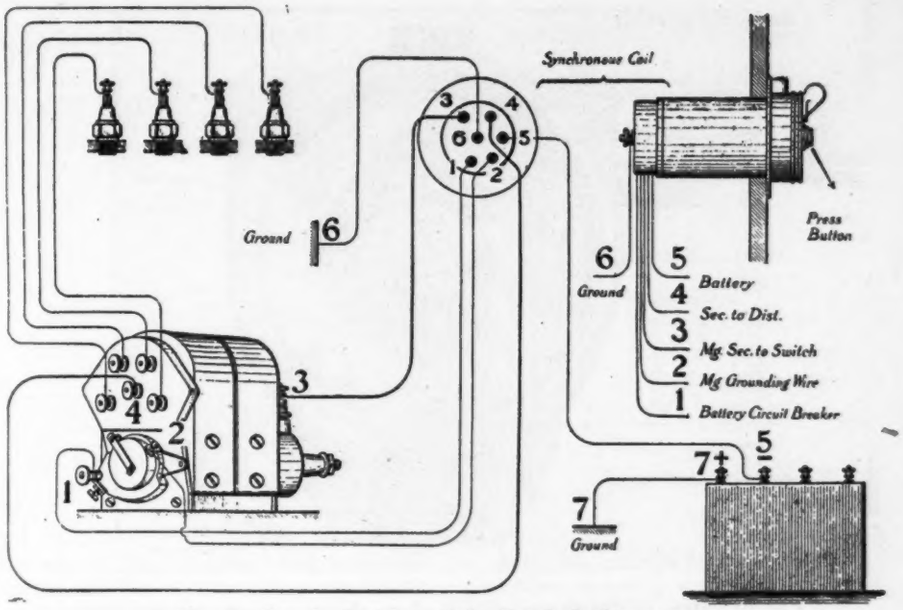


Fig. 7—Standard wiring of the Bosch dual system

CHARGING RATE

Q—What is the maximum charging rate of the Gray and Davis generator used on a 1920 Ford and at what speed is it obtained?—G. M. Newpart, Carlisle, Ark.

The generators are never set at their maximum charging rate but are adjusted to suit running conditions. The adjustment is accomplished by means of third brush regulation. The third brush is set to give a charging rate of about 12 to 14 amperes when the car is running at a speed of 18 to 22 miles per hour. The generator should never be set to charge at a much higher rate because of damage to the battery that will result.

CHEVROLET IGNITION

Q—When No. 1 piston comes to top center how should the distributer breaker points be?

2—In timing where should the spark advance be?

3—How far should the spark plug points be set?

4—The distributer points?

5—What is the speed of this car?

6—When driving about 25 m.p.h. with cut-out open this car sounds as though two cylinders make twice as much noise as the other two.

7—This car kicks regardless of how far the spark has been retarded.—Henry H. Reiser, Jr., St. Louis, Mo.

1—With the spark lever set in its center position and the piston about ⅛ in. from top dead center on the compression stroke the breaker points should just begin to open.

2—In timing it is always best to have the spark in the retarded position.

3—The spark plug gap should be about .025 in.

4—When the cam holds the breaker points apart the gap should be 1/32 in.

5—When everything is in proper adjustment this car should be able to make about 45 miles per hour.

6—This is probably due to the fact that two of the cylinders according to the firing order of the engine are nearer than the other two cylinders.

7—This certainly ought not to occur if the spark setting is correct. We advise checking the ignition timing carefully and the trouble will probably be eliminated.

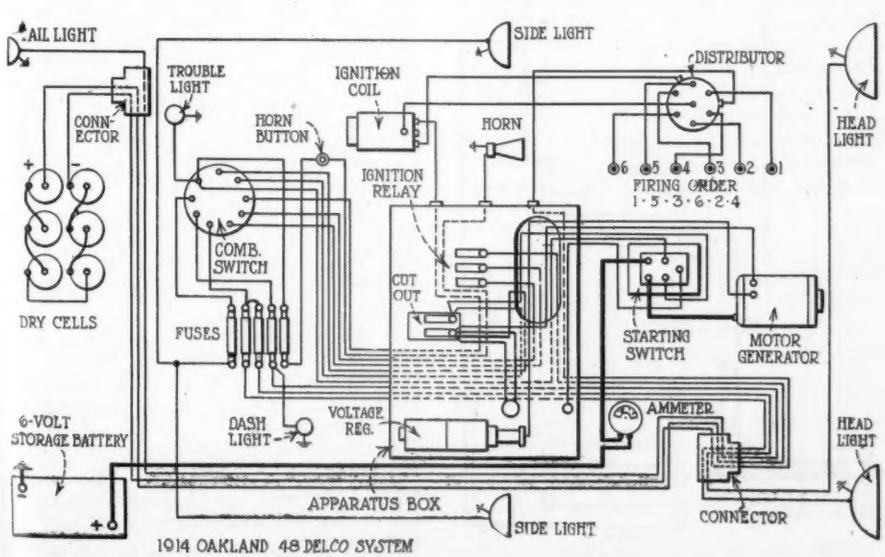


Fig. 6

DISTRIBUTER HEAD TERMINALS

Q—On the Westinghouse ignition head as used on a 1916 Case 40 car there are three binding posts, one admits primary or battery current to the coil. What are the functions of the other two?—H. G. Wenke, Hot Springs, S. Dak.

There are two primary leads one of which is connected to the source of current and the other one which should be connected to the switch. The third con-

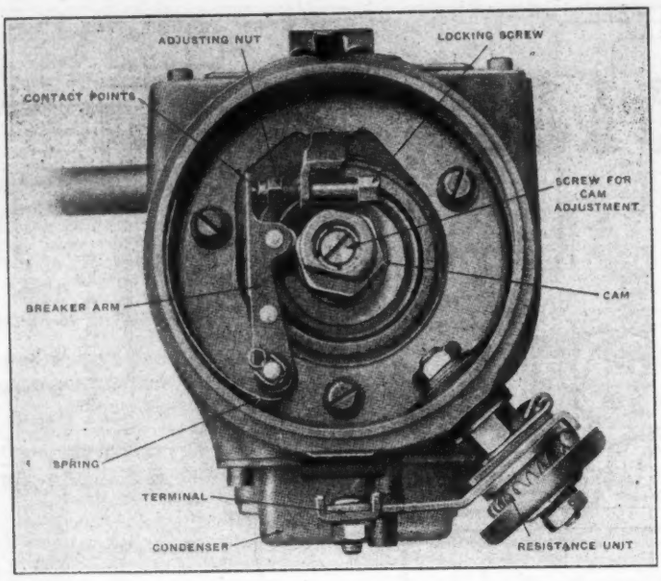


Fig. 8—View of distributer of a Hudson showing points of adjustment

nection is for the ground which may be connected to the frame or any other grounded part of the car.

ENTZ GENERATOR DIAGRAM

Q—Publish wiring diagram of Entz motor-generator model 386 as installed on some models of the White truck. This generator has six terminals and is a reverse series wound generator. The series winding terminated at three terminals on the generator case. It seems to have two series windings which enter from two separate terminals and come together at a third terminal on the generator case.—Maurice G. Davis, Auto Electric Service Co., Pawhuska, Okla.

This type of generator is known as a differentially wound generator. The series and shunt field coils are so connected as to operate as a compounded motor and a differential generator. Fig. 9 shows a diagram of the generator that will apply in your case.

INSTALLING SWITCH

Q—Publish wiring diagram showing how to install a 1920 type switch on a 1916 Chevrolet 490. The old switch has eight or ten wires to it and the new one only four or five.—Kellogg Garage Co., Kellogg, Idaho.

We do not believe you can connect the 1920 switch in on the circuit of 1916 cars. The whole wiring system would have to be changed which would hardly be worth while.

WESTINGHOUSE SYSTEM

Q—Publish wiring diagram of the 1919 Metz model 25 with the Westinghouse system showing colored wires and cut-out.—Motor Inn, Finlayson, Minn.

Wiring diagram of Metz model 25 is shown in Fig. 10.

BAD BATTERY GROUND

Editor Motor Age—I notice a question in the Aug. 5 issue of Motor Age referring to battery trouble in the Overland "4." I also had this trouble in many cars after setting up generators as high as 20 amperes, but find the trouble in most cases to be a bad battery ground. If Mr. Ford will look closely he will find the negative battery wire grounded to the bottom of the battery box with a small stove bolt in bad shape. Remove this bolt and ground the negative battery wire to the 5-16 bolt on the frame that holds the battery box in place and the trouble will in most cases end. I have also found shorts in dash lights on this model car due to the frame of the light touching the hole in the dash at the top of the light.

I also note the question in this same issue in regard to a knock in a Dodge engine. I also had this trouble and after cleaning carbon, retarding the spark set and other methods I put on another cylinder head gasket. This increased the compression and stopped the knock.—Phil H. Bate, Foreman Service Department, McNeel Auto Co., "Overland 4," Marietta, Ga.

Editor's Note: The remedies given are good examples of the individual characteristics of engine and electrical troubles that are best found by actual experiment.

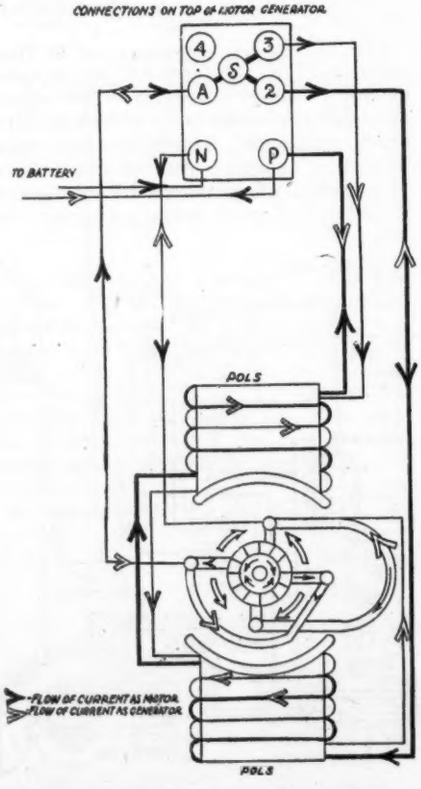


Fig. 9—Wiring of a differentially wound generator

Rebuilding

REBUILDING PACKARD 30

Q—Publish a design for a racy body roadster or speedster for a Packard 30, detailing front elevation, side and rear elevations.

2—Give details of valve and ignition timing so as to get best results for speed?

3—Would there be any great difference in speed of car by cutting wheels from 37 by 5 to 35 by 5 in.? If so how much?

4—What is the original speed of car.

5—What can be done to secure 75 m.p.h. from same?

6—Where can wire wheels and hubs be obtained for same?

7—What pressure of vacuum feed gives best results?

8—What carbureter would obtain best results, and what size and model?

9—Would a Liberty starter turn the motor over fast enough to start engine with a high tension Eisemann equipment? If not what would be best?—C. H. Lampe, Kansas City, Mo.

1—See Fig. 4.

2—The valve timing which will give the best results for speed is best determined by experiment and is somewhat dependent upon the conditions under which the car is to be driven. Unless you intend to use this car for racing purposes we do not see any reason for attempting to get 75 miles per hour out of it. If the valve timing is advanced one tooth it will give better results at high speed but will give every irregular running at low speeds.

3—There will be a slight difference in speed probably about 4 or 5 miles per hour when the car is running at its maximum.

4—The original speed of this car was about 55 to 60 miles per hour under average conditions.

5—In order to get 75 miles per hour it may be necessary to make quite a few changes. The first thing to do is to install lighter pistons and connecting rods and increase the size of the intake valves. This will give considerable increase in engine speed and consequently more power. The carbureter size should be increased slightly and of course the weight of the car should be reduced as much as possible. It is very probable that the gear ratio will have to be changed as well before this speed can be obtained. The carbureter setting and the valve timing will have a great influence on the car speed and it must be remembered that in order to obtain this high speed you will have to sacrifice some of the desirable running qualities at low speed.

6—Detroit Wire Wheel Corp., Detroit, Mich.; Marlin-Rockwell Corp., 347 Madison Ave., New York; Wire Wheel Corp. of America, 1700 Elmwood Ave., Buffalo, N. Y.

7—Either system will give very satisfactory operation but we believe the pressure system will prove the most satisfactory if the car is to be used for racing purposes.

8—We are in no position to recommend any make of carbureter. The proper size to be used can be recommended by the carbureter manufacturers if you will furnish the car specifications and explain what the car is to be used for.

9—Yes.

Engines

LOSES POWER AND KNOCKS

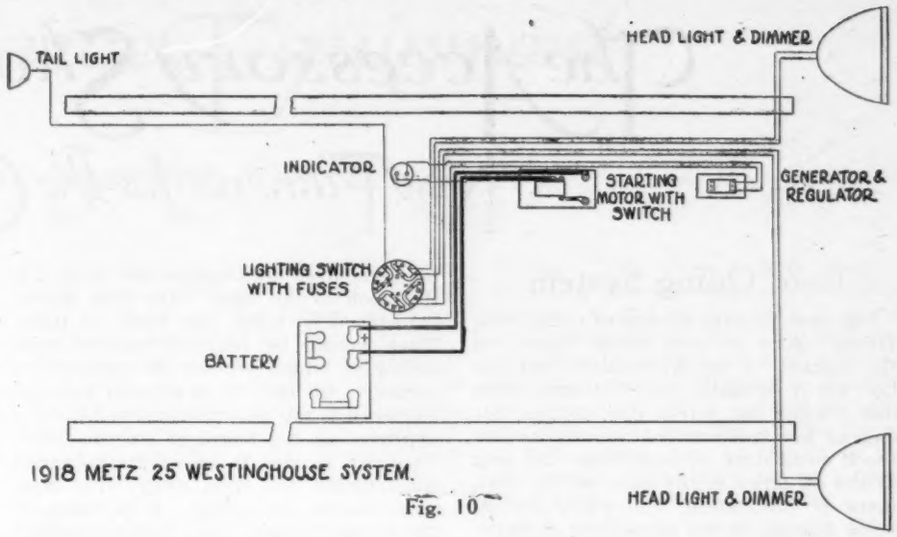
Q—Would removing one of the cylinder head gaskets of which there are now two, on a Hudson remedy the knock. For some time the engine had pep. There was a loud knock. It sounds as though the water system was always empty. There is a clicking noise. Have looked over the valve tappets and adjusted them. —Lawrence A. Caldarello, Kansas City Mo.

Of course we cannot tell the exact cause of the knock because of the lack of details. If the spark is advanced too far a knock will result and if this is the case it will be necessary to retime the distributer. It may be a result of too rich a mixture, loose connecting rods which will give a light knock at high speeds, crankshaft bearing loose which will give a heavy pounding at low speeds and under heavy loads, worn valve tappets, carbon in the cylinders or the automatic governor does not return to retard position easily. If the engine lacks power is may be caused by loss of compression due to leaky valves, too rich a mixture, late ignition or overheating.

The only suggestion that we can make is that you go over all of these parts carefully and make the necessary adjustments. It would be advisable to retime the ignition by the following method:

Set the spark lever on the steering wheel at the top and see that the advance rod which connects the advance lever and sector gear at the base of the steering box is not too long so as to bind the distributer advance ring. This rod should be adjusted so that the yoke end fits into the advance lever without any binding when the hand lever on the steering gear is fully advanced. The distributer advance ring will wear rapidly if this adjustment is not properly taken care of.

Open the priming cocks on the engine, turn slowly by hand, using the starting crank until number 1 cylinder starts to blow. This indicates that the cylinder is on the compression stroke. To determine this hold your finger over the priming cock. No. 1 cylinder is due to fire in advanced position when the mark A on the flywheel reaches the pointer attached to the crankcase. This may be observed through the hole on the flywheel housing on the left side of the engine. Mark A is 1-2 in. before top dead center. Top center is marked D C 1-6. Loosen cam and set to break at this point. The adjusting screw on the cam must always be set down tight after making the adjustment. The spark occurs the instant the timer contacts open. In checking the timing, the cam should be held on tension in the opposite direction of rotation so that all of the backlash is taken up when the rotor button comes under No. 1 contact on the distributer head. After checking the timing, replace the rotor. Rub a little vaseline on the rotor truck of the distributer head before seeing that this is down tight in position. Fig. 8 shows the distributer. After retiming and adjusting the carbureter we advise making an inspection of the valves to see if they are seating properly and clean all of the carbon of the engine. Also see if the valve guides are worn.



1918 METZ 25 WESTINGHOUSE SYSTEM.

Fig. 10

POWER CURVE

Q—Publish power curve of the 1920 Willys-Knight model 20.—Alois A. Pimper, West Point, Neb.

Power curve of the 1920 Willys-Knight is shown in Fig. 11.

NOISY TIMING GEARS

Q—I notice that most of the Buick cars seem to have trouble with their timing gears howling. Is there anything that can be done to prevent this? The car does not make this noise after it reaches a speed of 10 m.p.h. The Buick people here are unable to give any advice further than to put in new timing gears and this is rather an expensive thing to have done every two or three thousand miles.—C. V. King, Vernon, Tex.

If the timing gears are worn there is only one remedy and that is installation of new gears. If the gears are kept properly lubricated there is no reason why the gears should wear enough to warrant installation of new gears every two or three thousand miles or should give an excessive howling noise. The writer has driven a 1920 Buick for 10,000 miles and so far have had no difficulty with the timing gears. We advise abiding by the decision of your Buick dealer for it is very probable that the gears are worn enough to warrant a change. In some cases it has been found that the front main crankshaft bearing has worn enough to allow the crankshaft to raise slightly. This condition makes the timing gears mesh tighter and the result is a serious howl.

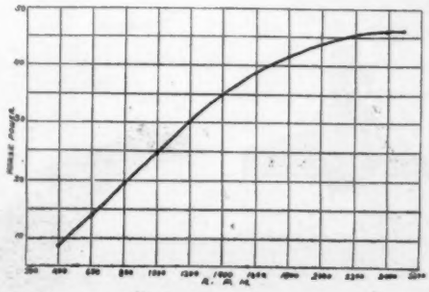


Fig. 11—Power curve of the 1920 Willys Knight engine

ENGINE KNOCK UNDER PULL

Q—What causes a 1916 Model 81 Overland to knock when negotiating a grade? Have been told it is a carbureter knock. The air valve has been adjusted but it still knocks.—Wm. Dool, Syracuse, N. Y.

The knock may be attributed to any one of a large number of factors. Your decision as to the cause will depend upon the kind of a knock that is produced. To determine the cause, first drive the car or let the engine run until it is warmed up. Choose a place with a slight incline say about 15 per cent. Drive the car at a speed of about 15 miles per hour and attempt to hold this speed up the grade. If you get a distinct metallic rap the push rods will probably be found out of adjustment. If it is a slight knock which increases as the car is placed under a heavier pull it may be worn pistons or rings. If the knock has a distinct metallic sound which is greatly increased as the throttle is opened, it may be attributed to carbon deposit in the combustion chamber and on the piston head. Should the knock be of a muffled sound it may be connecting rod trouble. The proper thing to do is to go over all of these things carefully and make the proper adjustments. We are inclined to believe that the trouble is carbon deposit or perhaps the spark is advanced too far. The carbureter setting may have an influence on the knock but if it is due to one of the other factors adjusting the carbureter will do very little good.

STEPHENS RECORDS

Q—Recently a Stephens Salient Six lowered all records in covering the distance from St. Louis to Chicago in 9 hours and 3 minutes, using 100 per cent coal oil for fuel. Would any special attachments be necessary to accomplish this? Was the same standard Tillotson carburetor used? C. B. Roy, Lafayette, La.

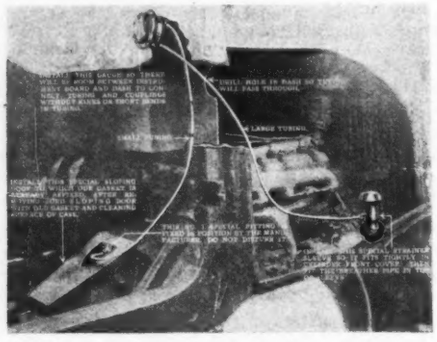
The Stephens Salient Six run recently was under the supervision of Davie Motor Car Co., the St. Louis distributors, and was not participated in any way by the Stephens Motor Works. But the factory states they are informed that the car was absolutely stock in every detail except the gasoline nozzle was reamed out a trifle larger than is regular, otherwise the carbureter was a standard Tillotson.

The Accessory Show Case

New Fitments for the Car

Ford Oiling System

The new positive system of oiling with visible speed is now being placed on the market by the Automotive Material Co., 208 N. Wabash Ave., Chicago. With this system the driver can always tell that he has sufficient oil because he can see it circulating while driving. As long as the oil flows in the gage on the dash there is lubrication, but when the oil stops flowing in the gage, it is a warning that the oil is running low. However, there is still a safety margin of twenty miles in which to obtain a new oil supply. The system is furnished complete for $10.00 and can be attached to the car in a few minutes.



Positive Ford oiling system

Twinlock Tire Carrier

The Twinlock tire carrier is a device that enables you to convert your present spare rim into a double tire carrier in a few moments, locking one or both tires. In attaching it to the present tire carrier it is not necessary to do any drilling but simply the adjusting of the three rods, shown in the illustration, by screwing them into the proper position. To mount the tires just place the tires and throw the lever over the hexagon nut and turn the knob to the right. The lock works automatically when the knob is tight. Tires cannot be removed without first unlocking which permits the knob to be turned to the left. It is claimed that the Twinlock is the only tire lock and carrier approved by the Board of Underwriters. This tire carrier is of very substantial construction and does away with lugs, nuts, chains and straps. It is listed at $18 by the Twinlock Co., 1525 Cambridge St., Philadelphia. The Twinlock can be used on practically any car with a circular tire carrier.

Masco Splash Fender

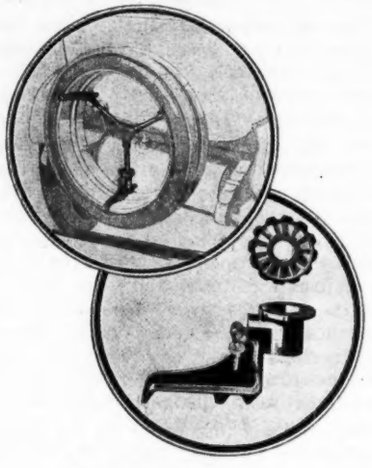
The Masco Splash Fender for Fords is made in one piece from cold-rolled sheet steel, black japanned. The wire edge and beading are made uniform with the finish of the Ford fenders. Each fender includes complete back support brackets and screws for attaching to lamp posts. The shock absorbers do not conflict with the installation of this fender but cars equipped with bumpers require a model of a little different construction. The Masco Splash Fender is a product of the Mayer Auto Specialty Co., Buffalo, and retails for $6.50.

Shock Absorber and Rear Bumper Combination

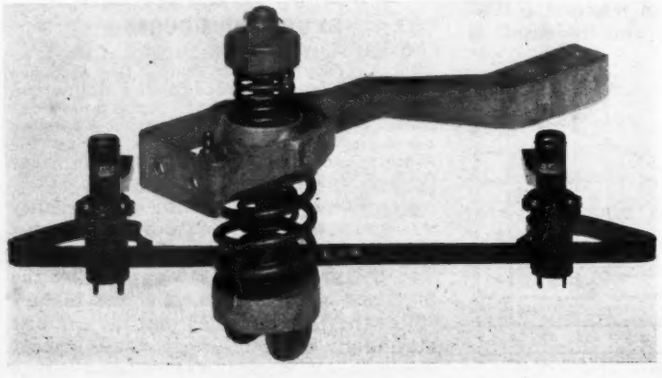
The shock absorber and rear bumper combination may be attached to any Dodge car by removing the Dodge scroll spring and replacing same with the arm and using the original Dodge bolt. The rear half of the Dodge spring is fastened to the bottom of the shock absorber with the original Dodge spring bolt. The bumper itself is of the spring type of construction and the shock absorber is built with a pair of coil springs as shown. The whole device when installed makes a very neat appearance in addition to furnishing very desirable service. It is manufactured by the E & W Company, Milwaukee, Wis.

Stewart Visible Gas Filter

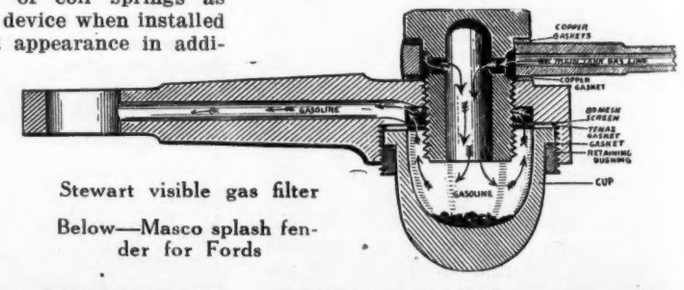
In spite of how careful the driver may be to prevent dirt from getting into the gasoline still there is always some dirt in the gasoline that ought to be removed before it enters the vacuum tank. The device, shown herewith, is designed to remove the dirt and water and is attached to the main feed line from the gasoline tank directly before the feed line enters the vacuum tank. The gasoline pumps through the intake tube closed down into the glass trap cup and then goes upward through the mesh and out through the shank to the vacuum tank. This filter is manufactured by the Automotive Material Co., 208 N. Wabash Ave., Chicago, and lists at $7.50.



Twinlock tire carrier



E and W combination shock absorber and rear bumper for attachment to the Dodge car



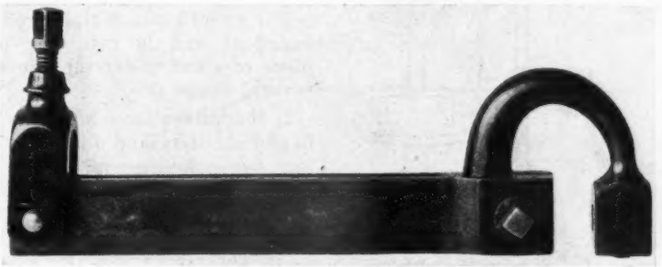
Stewart visible gas filter

Below—Masco splash fender for Fords

Service Equipment
Time Savers for the Shop

Derringer Combination Tool Holder

A combination tool holder for medium size work has recently been manufactured by Maurice H. Derringer, 3133 N. Eighth St., Philadelphia, Pa., that can be used alternately for square and round stock. It is made of high grade steel, all parts hardened and drawn, to prevent breakage.



Derringer combination tool holder

One side of the holder will take square stock up to 5/16 in. and can be used for turning, boring, and internal threading. By turning yoke to opposite side of holder it presents 45 degree slot, which will take round stock from ⅛ in. to 9/16 in. in diameter. This side of holder will also be found useful for boring or internal threading of small and large holes. It will also be found useful in many other ways, such as holding indicator or scriber for setting work dead true. The yoke that is attached to body of tool holder is fastened with a taper pin and can be removed in a few seconds. This yoke has a 5/16 in. screw in it, and when holder is placed in tool post of lathe it has a double grip on tool, the screws in yoke and tool post gripping the tool. This gives a firm grip on the tool and will absolutely prevent it from springing.

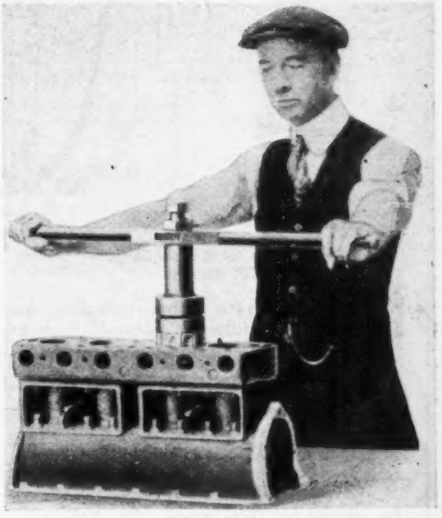
Another feature of the Derringer combination tool holder is a spring tool in the form of a goose-neck, which is brought into use by taking out taper pin that holds yoke in place and removing yoke. Goose-neck is then attached with taper screw and nut which after tightened up will positively prevent goose-neck from moving. This spring tool is broached to suit 5/16 in. tool bit and will be found ideal for cutting threads. Spring tool will also be found useful in planer, and shaper, as well as the lathe. Goose-neck can be used on right and left hand angles.

The tool holder can be assembled and taken apart in less than one minute and will be found desirable for more uses than space permits at this time to enumerate. It can be used on lathes that will swing from 12 in. up to 20 in. and promises to be an excellent time and money saver. Further information regarding this tool can be obtained from the inventor.

Johnson Expansion Reamer

The Johnson Expansion Reamer is designed with the blades seated on a spindle and this spindle is operated by a dial which is graduated in one-half thousandths. This gives a large range of expansion without distortion of cutting blades. A tool of this kind is a very serviceable tool for any shop and combines the advantages of both solid and expansion reamer without the disadvantage of either. It is possible to adjust the blade while reaming without the use of lock screws, pins or clamps to hold the blades. The blades can be renewed indefinitely.

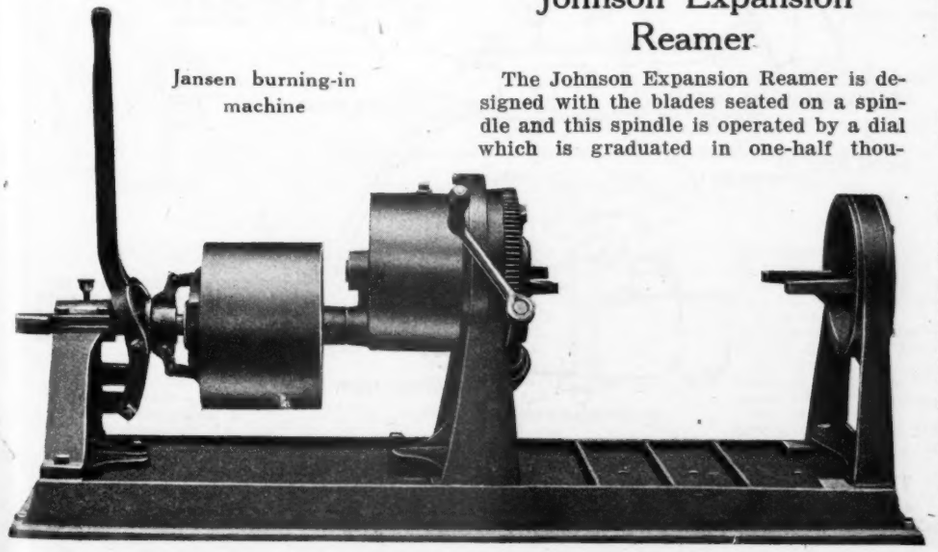
This reamer is manufactured by the Foster-Johnson Reamer Co., Elkhart, Ind., and the prices vary according to the size of the reamer desired.



Johnson expansion reamer

The Jansen Burning-in Machine

The machine, shown herewith, is designed to meet the demands of service stations for burning-in, testing out, and running-in assembled engines. It is a universal machine that will handle any type of engine made.

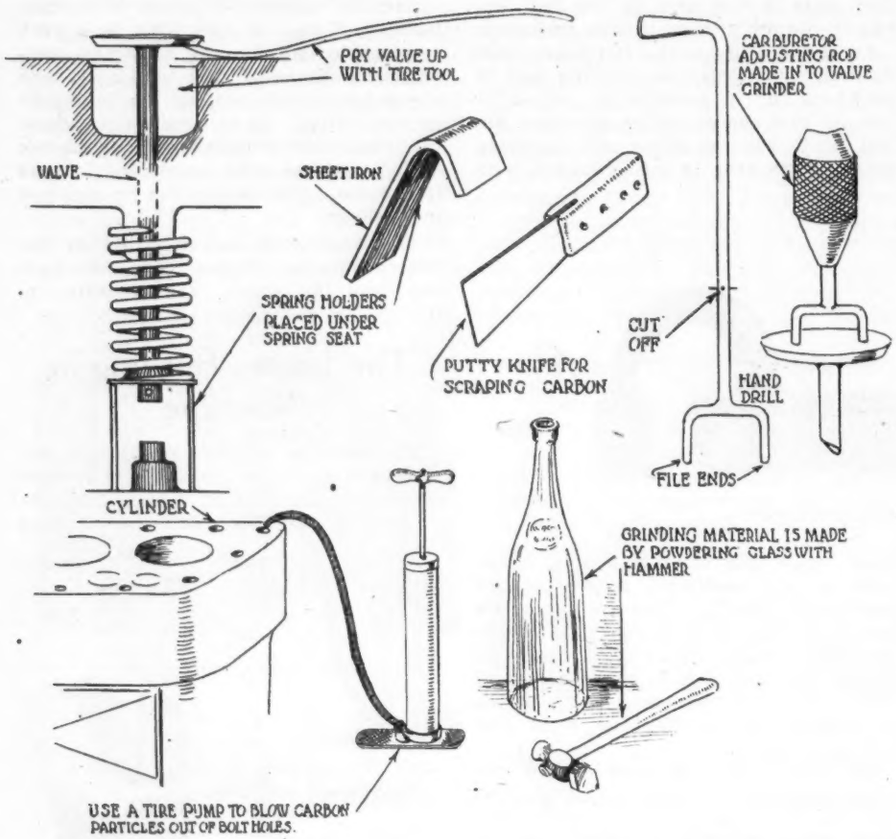


Jansen burning-in machine

The entire machine requires very little power for operation and one or more bearings can be burned in at a time. Another feature is that the machine is built on the interchangeable plan which permits the replacing of any broken parts without throwing the entire machine out of commission. A try out lever is provided so that the stiffness of the engine and bearings can be determined at any time. This machine is 5 ft. long, 19 in. wide and 2 ft. high. The pulley is 10 in. in diameter with an 8-in. face. It runs at a speed of from 600 to 800 r.p.m. The price of this outfit is listed by T. W. Jansen Mfg. Co., 739-741 Twenty-first St., Des Moines, Iowa, at $250.

The Automotive Repair Shop

Practical Maintenance Hints


PRY VALVE UP WITH TIRE TOOL
VALVE
SHEET IRON
SPRING HOLDERS PLACED UNDER SPRING SEAT
PUTTY KNIFE FOR SCRAPING CARBON
CARBURETOR ADJUSTING ROD MADE IN TO VALVE GRINDER
CUT OFF
HAND DRILL
FILE ENDS
CYLINDER
GRINDING MATERIAL IS MADE BY POWDERING GLASS WITH HAMMER
USE A TIRE PUMP TO BLOW CARBON PARTICLES OUT OF BOLT HOLES.

Hints to facilitate valve grinding and carbon removal. A grinding material giving good results is ground glass which can be made by pounding glass with a hammer and adding oil

Carbon Removal and Valve Grinding Kinks

To expedite this work the following suggestions and illustrations on this page can be used to that advantage.

Open the radiator drain cock, if an anti-freeze is in the engine, then take out only two gallons, this will lower the water level sufficiently to remove the cylinder head without wasting the anti-freeze.

Remove the spark plug wires and tie these to the radiator brace rod. Unscrew the spark plugs and take out the two screws holding the top radiator connection. Take out the fifteen cylinder head bolts, and place the bolts and spark plugs in a can of kerosene to soak.

Remove the cylinder head to a bench and place the gasket carefully aside. Take off the valve covers and having previously made two spring holders as shown in the sketch, insert the end of a tire tool under the valve head, when raised, pry this up and put the spring holder under the spring cap. Remove the pin and take out the next valve in a like manner, grinding two valves at a time, using a small hand drill and the special tool for rotating the valve. This tool is made from the end of a carbureter needle valve adjuster.

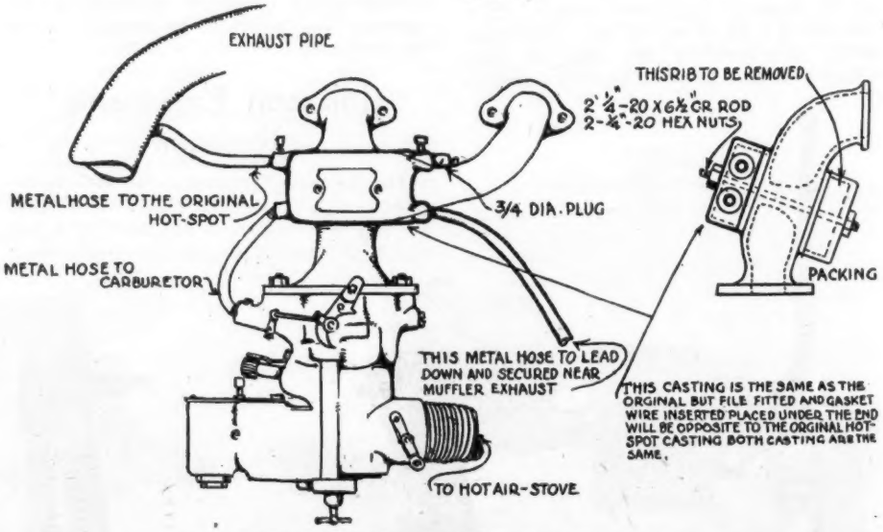
For grinding material, ground glass is excellent and is made by pounding a piece of glass under the hammer, adding several drops of oil.

If the valves have not been ground for five or six thousand miles, the first grinding for rapidity may be done with emery and oil otherwise gound glass is advised, anyway for polishing the seat.

No tool is quite as handy as a putty knife for taking out the carbon. With the valves ground and the carbon removed, the cylinder head gasket is cleaned and each side coated liberally with cup grease, graphite grease is better, do not use shellac, as this ruins the gasket.

Use a tire pump to blow the particles of carbon out of the bolt holes. Put on the head and before inserting the bolts coat the threads with grease, this makes them easier to remove the next time.

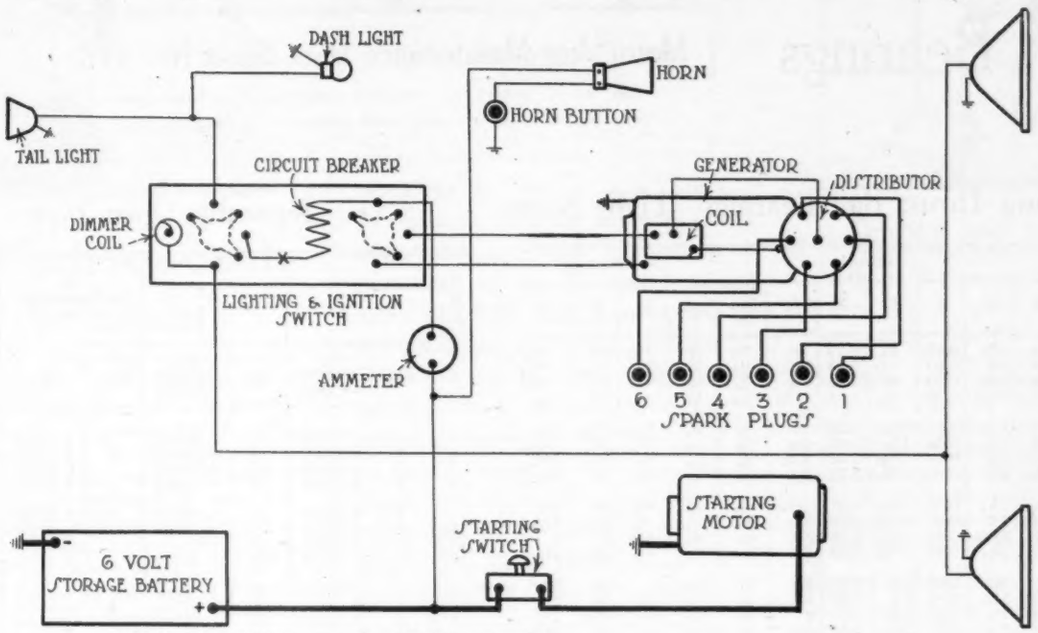
The spark plugs, if not entirely cleaned in the kerosene, should be scraped with the point of a knife. The points are gaged with a thin dime as a spacer for the distance between the points. Place grease on the threads before screwing them in.


EXHAUST PIPE
THIS RIB TO BE REMOVED
2-¼"-20 X 6½" CR ROD
2-¼"-20 HEX NUTS
METAL HOSE TO THE ORIGINAL HOT-SPOT
3/4 DIA. PLUG
METAL HOSE TO CARBURETOR
PACKING
THIS METAL HOSE TO LEAD DOWN AND SECURED NEAR MUFFLER EXHAUST
THIS CASTING IS THE SAME AS THE ORGINAL BUT FILE FITTED AND GASKET WIRE INSERTED PLACED UNDER THE END WILL BE OPPOSITE TO THE ORGINAL HOT-SPOT CASTING BOTH CASTING ARE THE SAME.
TO HOT AIR-STOVE

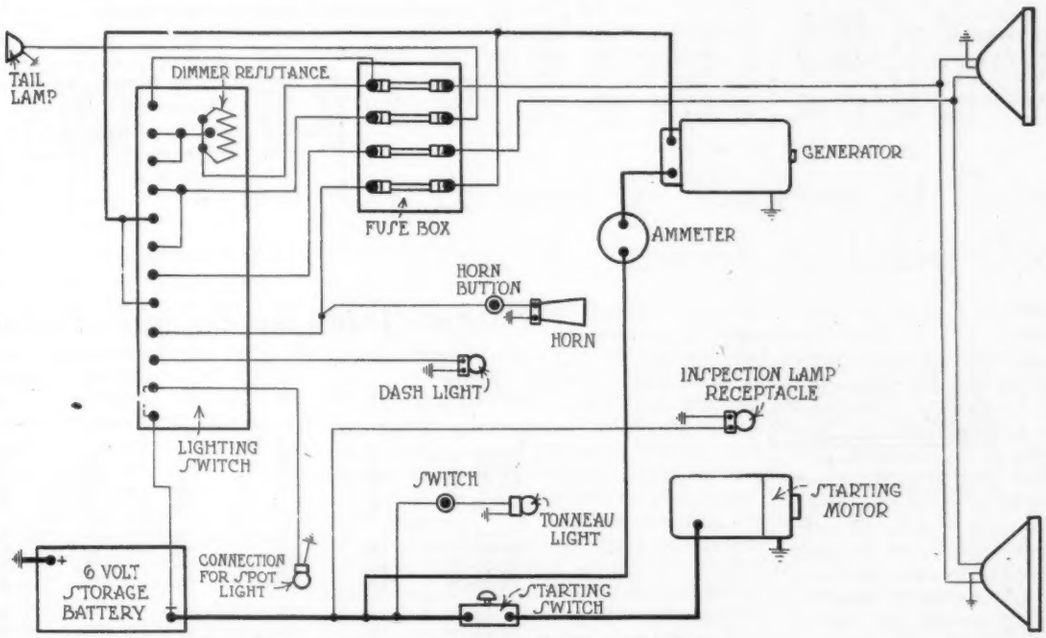
HOT SPOT MANIFOLD FOR BUICK D-44-45

The hot spot manifold, shown herewith, has demonstrated good performance and can easily be constructed for about $2. Full instructions for its construction are given in the drawing

Motor Age Weekly Wiring Chart No. 93



1917-1918 MOON 6-43 DELCO SYSTEM



1918 DORRIS I-C-6 WESTINGHOUSE SYSTEM

Name of car and date on which wiring diagrams have appeared in previous issues

Allen—June 17, '20
Apperson—Aug. 5, '20
Briscoe—May 6, '20
Buick—July 15, '20
Case—Aug. 5, '20
Chalmers—June 17, '20
Chandler—May 20, '20
Cole—June 10, '20
Crow-Elkhart—July 29, '20
Davis—Aug. 12, '20
Dort—Aug. 12, '20
Elcar—May 6, '20
Franklin—June 3, '20
General Battery Charging—Sept. 15, '19
General Magneto Diagram—June 15, '19
Grant—Aug. 12, '20
Harroun—July 15, '20
Haynes—June 24, '20
Hupmobile—May 27, '20
Internal Connections—July 10-17-24, '19
Jeffery—May 13, '20
Jordan—June 10, '20—July 22, '20
King—May 20, '20
Kissel—May 27, '20—Aug. 19, '20
Lexington—July 29, '20
Locomobile—June 3, '20
Moline-Knight—May 20, '20—July 22, '20
Moon—July 8, '20—July 29, '20—Aug. 19, '20
Peerless—May 13, '20
Pierce-Arrow—July 15, '20
Reo—July 22, '20
Roamer—Aug. 5, '20
Scripps-Booth—Aug. 26, '20
Studebaker—July 1, '20
Stutz—July 8, '20
Special Systems for Fords—May 15-22, '19

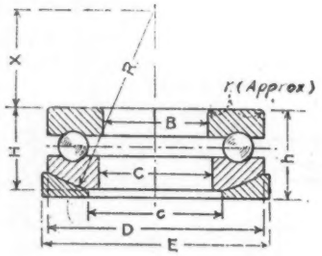
Dimensions and Numbers of Standardized Bearings

Motor Age Maintenance Data Sheet No. 112

One of a series of weekly pages of information valuable to service men and dealers—save this page

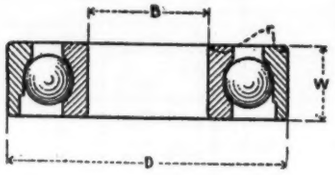
Self-Aligning Thrust Ball Bearings—Light Series

Bearing Number	Bearing B	D	H	C	X	R	Ball Dia. d	r	Washer h	E	e
TS-L- ½	½	1 3/16	0.48	9/16	0.72	1 1/4	3/16	1/32	1 3/32	1 1/4	1 1/16
TS-L- 9/16	9/16	1 1/16	0.52	1 1/16	0.86	1 5/16	3/16	1/32	9/16	1 5/16	3 3/32
TS-L- ⅝	⅝	1 5/16	0.55	1 1/16	1.01	1 5/8	3/16	1/32	1 9/32	1 5/8	1 5/16
TS-L- ¾	¾	1 11/16	0.59	1 5/16	1.14	1 13/16	3/16	1/32	2 1/32	1 7/8	1 5/16
TS-L-1	1	1 7/8	0.62	1 11/16	1.29	2	1/4	1/32	1 11/16	1 15/16	1 13/32
TS-L-1 1/16	1 1/16	2 1/16	0.66	1 13/32	1.49	2 1/4	1/4	1/32	2 3/32	2 1/16	1 13/32
TS-L-1 1/8	1 1/8	2 1/8	0.69	1 13/32	1.63	2 5/16	1/4	1/32	2	2 1/16	1 13/32
TS-L-1 3/16	1 3/16	2 1/8	0.73	1 13/32	1.77	2 5/16	1/4	1/32	1 15/16	2 1/16	1 13/32
TS-L-1 1/4	1 1/4	2 5/16	0.76	1 13/32	1.91	2 13/16	5/16	1/16	2 3/32	2 1/16	1 3/4
TS-L-1 5/16	1 5/16	2 3/4	0.80	1 13/32	2.04	3	5/16	1/16	2 3/32	2 15/16	1 13/32
TS-L-1 3/8	1 3/8	2 13/16	0.83	1 13/32	2.26	3 1/16	5/16	1/16	1 15/16	3	2 —
TS-L-1 7/16	1 7/16	3 1/16	0.87	1 13/32	2.33	3 3/16	5/16	1/16	2 1/32	3 1/16	2 1/32
TS-L-2	2	3 1/4	0.91	2 3/32	2.40	3 1/2	3/8	1/16	1	3 3/8	2 3/32
TS-L-2 1/16	2 1/16	3 5/16	0.94	2 1/16	2.60	3 3/8	3/8	1/16	1 1/32	3 1/2	2 3/16
TS-L-2 1/8	2 1/8	3 3/8	0.98	2 3/16	2.81	4	3/8	1/16	1 1/16	3 11/16	2 5/16
TS-L-2 3/16	2 3/16	3 1/4	1.01	2 1/16	2.88	4 1/16	3/8	1/16	1 1/8	3 3/8	2 11/16
TS-L-2 1/4	2 1/4	3 11/16	1.05	2 5/16	3.09	4 3/16	7/16	3/32	1 3/32	4 1/16	2 3/32
TS-L-2 5/16	2 5/16	4 1/16	1.08	2 1/4	3.17	4 1/2	7/16	3/32	1 5/16	4 1/4	2 3/32
TS-L-2 3/8	2 3/8	4 5/16	1.12	2 1/2	3.38	4 3/4	7/16	3/32	1 1/4	4 3/16	3 3/32
TS-L-2 7/16	2 7/16	4 7/16	1.15	3	3.58	5	7/16	3/32	1 9/32	4 9/16	3 1/4
TS-L-3	3	4 5/8	1.19	3 1/8	3.65	5 1/16	1/2	3/32	1 5/16	4 3/4	3 1/8
TS-L-3 1/16	3 1/16	4 13/16	1.22	3 1/4	3.86	5 3/8	1/2	3/32	1 3/8	4 13/16	3 1/8
TS-L-3 1/8	3 1/8	5	1.26	3 13/32	3.93	5 1/2	1/2	3/32	1 13/32	5 1/8	3 13/32
TS-L-3 3/16	3 3/16	5 1/16	1.33	3 13/32	4.08	5 3/4	9/16	3/32	1 11/32	5 5/16	3 13/32
TS-L-3 1/4	3 1/4	5 11/16	1.40	3 29/32	4.49	6 1/4	9/16	3/32	1 9/16	5 13/16	4 5/16
TS-L-4	4	6	1.47	4 5/32	4.77	6 5/8	5/8	3/32	1 5/8	6 5/16	4 11/32



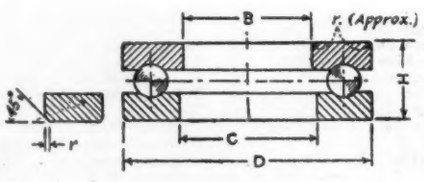
Separable Open Type

Bearing Number	B Mm.	B In. +0.0000 −0.0005	D Mm.	D In. +0.0005 −0.0000	W of Individual Ring Mm.	W of Individual Ring In.	r Corner Radius, Min Mm.	r Corner Radius, Min In.
5	5	0 19685	16	0.62992	5	0.19685	0.2	0.008
6	6	0.23622	21	0.82677	7	0.27559	0.3	0.012
7	7	0.27559	22	0.86614	7	0.27559	0.3	0.012
8	8	0.31496	24	0.94488	7	0.27559	0.3	0.012
9	9	0.35433	28	1.10236	8	0.31496	0.3	0 012
10	10	0.39370	28	1.10236	8	0.31496	0.3	0.012
11	11	0.43307	32	1.25984	7	0.27559	0.4	0.016
12	12	0.47244	32	1.25984	7	0.27559	0 4	0.016
13	13	0.51181	30	1.18110	7	0.27559	0.3	0 012
14	14	0.55118	35	1.37795	8	0.31496	0.5	0.020
15	15	0.59055	35	1.37795	8	0.31496	0.5	0.020
16	16	0.62992	38	1 49607	10	0.39370	1 0	0.040
17	17	0.66929	44	1.73229	11	0.43307	1 0	0.040
18	18	0.70866	40	1.57481	9	0.35433	1 0	0.040
19	19	0 74803	40	1.57481	9	0.35433	1 0	0.040



Flat-Face Thrust Ball Bearings—Medium Series

Bearing Number	B	D	H	C	Ball Dia. d	r
TP-M- ½	½	1 3/8	9/16	9/16	1/4	3/32
TP-M- 9/16	9/16	1 9/16	1 9/32	1 1/16	1/4	3/32
TP-M- ⅝	⅝	1 3/4	2 1/32	1 3/16	1/4	3/32
TP-M- ¾	¾	1 15/16	1 1/16	1 5/16	9/16	3/32
TP-M-1	1	2 1/8	2 3/32	1 1/16	9/16	3/32
TP-M-1 1/16	1 1/16	2 5/16	2 3/32	1 13/32	9/16	3/32
TP-M-1 1/8	1 1/8	2 1/2	1 3/16	1 13/32	5/8	3/32
TP-M-1 3/16	1 3/16	2 11/16	2 3/32	1 13/32	5/8	3/32
TP-M-1 1/4	1 1/4	2 3/4	2 3/32	1 29/32	5/8	1/16
TP-M-1 5/16	1 5/16	3 1/16	1 5/16	1 29/32	7/16	1/16
TP-M-1 3/8	1 3/8	3 1/4	2 1/32	1 29/32	7/16	1/16
TP-M-1 7/16	1 7/16	3 7/16	1 1/32	1 29/32	9/16	1/16
TP-M-2	2	3 3/8	1 1/16	2 3/32	1/2	1/16
TP-M-2 1/16	2 1/16	3 13/16	1 1/32	2 1/4	1/2	1/16
TP-M-2 1/8	2 1/8	4	1 9/32	2 3/16	1/2	1/16
TP-M-2 3/16	2 3/16	4 3/16	1 5/16	2 1/2	9/16	1/16
TP-M-2 1/4	2 1/4	4 3/8	1 1/32	2 3/16	9/16	3/32
TP-M-2 5/16	2 5/16	4 7/16	1 9/32	2 1/4	9/16	3/32
TP-M-2 3/8	2 3/8	4 3/4	1 5/16	2 3/16	5/8	3/32
TP-M-2 7/16	2 7/16	4 15/16	1 13/32	3	5/8	3/32
TP-M-3	3	5 1/16	1 13/32	3 1/16	5/8	3/32
TP-M-3 1/16	3 1/16	5 5/16	1 7/16	3 1/4	13/16	3/32
TP-M-3 1/8	3 1/8	5 1/2	1 13/32	3 13/16	13/16	3/32
TP-M-3 1/2	3 1/2	5 7/8	1 9/16	3 29/32	3/4	1/16
TP-M-3 3/8	3 3/8	6 1/4	1 29/32	3 29/32	3/4	3/32
TP-M-4	4	6 5/8	1 29/32	4 5/32	13/16	3/32



Law in Your Business

By Wellington Gustin

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty problems as may be submitted to him.

Errors Which Are Costly to the Dealer

SOME errors of serious consequences to the parties were shown in a decision of the Supreme Court of Errors of Connecticut, just handed down. The dealer delivered an automobile to a buyer under a writing which purported to be a conditional contract of sale, but which was neither acknowledged nor recorded under the state laws. Thereafter a creditor of the buyer sued him for a debt and attached the automobile. Substantially, all of the purchase price of the automobile remained unpaid. The attaching creditor released and discharged the attachment upon the buyer's promise to pay by small weekly installments the debt upon which suit had been brought. Subsequently the buyer returned the automobile to the dealer who took possession of it and again sold it to the same buyer under a new conditional bill of sale, which was promptly acknowledged and recorded in conformity with the law, and by which title to the automobile remained in the dealer until it was fully paid for.

Later the buyer's creditor again attached the automobile to recover the still unpaid debt upon which the first suit was founded. After judgment against the buyer, the automobile was sold at public auction and bought in for a nominal sum by the creditor. At this time the buyer's payments to the dealer under the conditional sale contract was in default, and the dealer, by this contract, was entitled to the possession of the automobile. Now the dealer requested the amount still due (from the buyer) on the car from the attaching creditor, now in possession of the car, and this being refused, the dealer replevined the car. The Supreme Court in this decision awards the car to the dealer.

Though He Wins; He Loses

The case shows the futility of a creditor attempting to collect a debt where the debtor is unable to pay. Though he wins; he loses. It is throwing good money after bad. A party often prosecutes a cause hoping to secure a settlement.

But the legal features of this case are found in the liens of the parties. The dealer's lack of knowledge of the law or his negligence permitted a car to be sold without securing his lien or title to the car. Because he did not record his conditional sale contract, his lien right did not attach, such that, when his buyer's creditor attached the car, he stood to lose all due on the car and the car itself. The lien of the attachment upon judgment became a prior lien or first lien on the car. The dealer had nothing but a worthless contract with one unable to pay.

Fortunately for the dealer, but unfortunately for the attaching creditor, the attachment was released. This also released the lien of the creditor. The dealer seized this opportunity to get back the automobile and make another conditional sale contract with the buyer. And this time he records this contract according to law which gives him first lien on the car he has sold.

Presents Valuable Lesson

Now, the creditor, subsequently attaching the same car of his debtor, can have no lien superior to the dealer's lien of the contract reserving title until the car is paid for. It was a narrow escape from loss to the dealer, and was a total loss to the attaching creditor who let go his toe-hold under his first attachment. There are many lessons in this case for every dealer and business man.

Car Damaged by Employee of Garage—Was It Negligent to Leave Doors Open?

THE Supreme Court of North Carolina has awarded a new trial to the Universal Garage Company of Fayetteville, N. C., in the action brought against it by C. H. Farrell. The latter had left his automobile at the garage of the defendant to be taken care of for hire. The car was taken from the garage at night by one Lee, who was an employee of the garage, and damaged. It appears that at the time of the taking, the doors of the garage were open, with no one to protect it, the night man in charge of the garage having gone upstairs to close some windows. Hearing a noise, the night man ran downstairs and found Lee, a dayman, leaving with the Farrell automobile. Lee was remonstrated with but could not be stopped. When the car was returned in a damaged condition, Farrell sued the garage to recover damages for the injuries to his car.

Farrell alleged negligence of the garage keeper in leaving the motor car unprotected with the doors open and no one in charge, so that any one passing could take it, and that the damages resulted by reason of the failure of the garage keeper to exercise ordinary care. the court held to be the difference before fact for the jury to determine. If found negligent, then the keeper was liable.

The measure of damages in such case the court held to be the difference between the value of the automobile before and after its injury, and in estimating this difference it is proper for the jury to consider the cost and expenses of repairs, and in some instances this may be the damage which a party may be entitled to recover, but in the present case the cost of repairs might be more or less, therefore the court said it was better to adhere to the former well settled rule. Judgment against the garage was reversed and new trial granted because of admission of improper evidence prejudicial to the garage in the trial court.

ZONE SALES MANAGER FOR SIMMS

Atlanta, Ga., Aug. 27—C. M. Love, one of the pioneer automobile men of the South, and for twelve years connected with the Studebaker Corp., has been named zone sales manager of the new Simms Motor Car Corp., now arranging to establish a factory here for the manufacture of a medium priced light four car.

Motor Age Monthly Passenger Car Specification Tables

These prices apply to five and seven-passenger models only.

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. HP.	Carburetor Size and Make	Gear Ratio	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Ace T. L.	5	2050	115	32x4	Firestone	3½x5	H-S	6	25.35	1½—Strom.	4.50	Detlaff	Warner	Detroit	Spacke	Gemmer	Stewart	Firestone	6	170	U. S. L.	A-L	A-L	A-K	6	Ace T. L
Allen 43	....	1595	110	.....	Miller	3½x5	Own	4	19.60	1—Strom.	4.60	B. and B.	Own	Detroit	Columbia	Own	.....	Stanweld	6	.....	U S L.	West.	West	Conn.	6	Allen 43
American C	5	2295	127	32x4	.....	3½x5	H-S	6	25.35	1½—Strom.	4.50	B. and B.	Warner	Hart	Salisbury	Warner	V. Sicklen	Firestone	6-8	100	Willard	G & D.	G. & D.	Conn.	6-8	American C
American Beauty	5	2450	121	33x4	Firestone	3½x5	H-S	6	25.35	1½—Ray.	4.90	B. and B.	Detroit	Acme	Timken	Standard	Warner	Firestone	6	110	Willard	West.	West.	A-K	6	American Beauty
Anderson Series 30	5	2145	120	33x4	Goodrich	3½x4½	Cont.	6	25.35	Ray.	4.50	B. and B.	Durston	Ther-H	Salisbury	Jacox	Stewart	Firestone	6	111	Willard	Remy	Remy	Remy	6	Anderson Series 30
Apperson Anniversary	7	4250	130	34x4½	U. S	3½x5	Own	8	33.80	1½—John.	4.25	Own	Own	Sterling	Own	Own	V. Sicklen	Firestone	6	110	Willard	Bijur	Bijur	Remy	6	Apperson Anniversary
Apperson 8-20	7	3500	130	34x4½	Goodyear	3½x5	Own	8	33.80	1½—John.	4.25	Own	Own	Sterling	Own	Own	V. Sicklen	Firestone	6	110	Willard	Bijur	Bijur	Remy	6	Apperson 8-20
Auburn 6-39	5	1895	120	33x4	Goodrich	3½x4½	Cont.	6	25.35	1—Ray.	4.66	B. and B.	G-L	Hartford	Col.	Jacox	Stewart	Firestone	6	80	Willard	Remy	Remy	Remy	6	Auburn 6-39
Beggs 6	5	2150	120	33x4	Goodrich	3½x4½	Cont.	6	25.35	1—Strom.	.....	B. and B.	Detroit	Arvac.	Stan-Par	Ditweiler	Stewart	Firestone	6	100	Exide	A-L	A-L	Conn.	6	Beggs 6
Bell	5	1495	114	31x4	Miller	3½x4½	C. B. & S.	4	22.50	1—Strom.	.....	.....	Muncie	Hart	Peru	Warner	Stewart	Firestone	6	.....	Prest.	A-L	.....	A-K	6	Bell
Bour Davis 20	5	1800	118	32x4	Goodyear	3½x4½	Cont.	6	25.35	1—Strom.	4.75	B. and B.	Detroit	Mechanics	Salisbury	C. A. S.	Stewart	Perlman	6	115	Willard	Remy	Remy	Remy	6	Bour-Davis 20
Bour-Davis 21 S. & R.	7	2875	126	33x4½	Goodyear	3½x5½	Cont.	6	29.40	1½ —Zen.	4.50	Muncie	Muncie	Spicer	Salisbury	Lavine	Stewart	Firestone	6	115	Willard	West.	West.	West.	6	Bour-Davis 21 S. & R.
Brewster	4	9000	125	34x4½	Kelly-S	4x5½	Own	4	25.60	1½—Strom.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	12	80	U. S. L.	U. S. L.	U. S. L.	Berl.	.....	Brewster
Briscoe 4-34	5	1285	109	31x4	optional	3½x5	Own	4	18.23	1—	4.18	Own	Own	Own	Own	Own	Stewart	Hayes	6	80	Prest.	A-L	A-L	Conn.	6	Briscoe 4-34
*Buick 21-45	5	1795	118	33x4	Goodyear	3½x4½	Own	6	27.34	—Mar.	4.00	Own	Own	.....	Own	Own	A-C	Own	6	80	Willard	Delco	Delco	Delco	6-8	Buick 21-45
*Buick 21-49	7	2065	124	34x4½	Goodyear	3½x4½	Own	6	27.34	—Mar.	4.00	Own	Own	.....	Own	Own	A-C	Own	6	80	Willard	Delco	Delco	Delco	6-8	Buick 21-49
Cadillac 59	7	3940	132	35x5	optional	3½x5½	Own	8	31.25	1½—Own*	5.07	Own	Own	Spicer	C-Timk.	Own	V. Sicklen	Kelsey	6	.....	Exide	Delco	Delco	Delco	6-3	Cadillac 59
Case V	7	2650	126	34x4½	Goodyear	3½x5½	Cont.	6	29.40	1½—Ray.	4.45	B. and B.	G-L	Peters	Col.	Jacox	V. Sicklen	Firestone	6	118	Willard	West.	West.	Delco	6	Case V
Chalmers 35-C	5	1945	117	32x4	optional	3½x4½	Own	6	25.35	.....	.....	Own	Own	.....	.....	Own	.....	.....	6	106	.....	.....	.....	.....	6	Chalmers 35-C
Chalmers 35-B	7	2095	122	33x4½	optional	3½x4½	Own	6	25.35	.....	.....	Own	Own	.....	.....	Own	.....	.....	6	106	.....	.....	.....	.....	6	Chalmers 35-B
Champion C-4	5	1350	116	32x3½	Goodrich	3½x5	Lyco	4	19.60	1—Zen.	4.25	B. and B.	G-L	.....	Peru	C. A. S.	Stewart	Stanweld	6	80	Willard	Delco	Delco	Delco	6	Champion C-4
Champion S-4	5	1550	118	32x4	Goodrich	3½x5	H-S	4	19.60	1—Zen.	4.25	B. and B.	G-L	.....	Peru	C. A. S.	V. Sicklen	Stanweld	6	80	Prest.	Dyn.	Dyn.	A-K	6	Champion S-4
Chandler	7	1895	123	33x4	Goodrich	3½x5	Own	6	29.40	1½—Ray.	4.40	B. and B.	Own	Hartford	Own	Gemmer	Stewart	Firestone	6	105	Prest.	G. & D.	G. & D.	Bosch	6	Chandler
Chevrolet 4-90	5	795	102	31x4	Goodyear	3½x4	Own	4	21.76	1½—Zen. ♯	3.63	Own	Own	Own	Own	Warner	Stewart	Perl-Jack.	6	80	Willard	A-L	A-L	Simms	6	Chevrolet 4-90
Chevrolet F. B.	5	1295	110	33x4	Goodyear	3½x5½	Own	4	27.10	1½—Zen.	4.62	Own	Warner	Own	Own	Warner	Stewart	Perl-Jack.	6-8	105	Willard	A-L	A-L	Simms	6	Chevrolet F. B.
Cleveland 40	5	1485	112	32x4	Goodrich	3x4½	Own	6	21.60	1—Strom.	4.45	B. and B.	Mechanics	Mechanics	Own	Ditweiler	V. Sicklen	Firestone	6	94	Prest.	G. & D.	G. & D.	Bosch	6	Cleveland 40
Climber 4	5	1550	117	33x4	Goodyear	3½x5	H-S	4	19.60	—Strom.	4.80	B. and B.	B-L	Hartford	Adams	Warner	V. Sicklen	Jacox	....	80	Willard	West.	West.	A-K	6	Climber 4
Climber 6	7	2450	120	33x4½	Goodyear	3½x5	Cont.	6	25.35	—Strom.	4.75	B. and B.	B-L	Hartford	Timken	Warner	V. Sicklen	Firestone	....	120	Willard	West.	West.	A-K	6	Climber 6
Cole Aero Eight 870	7	3250	127	33x5	Firestone	3½x4½	North.	8	39.20	1½—John.	4.45	North.	North.	Spicer	Col.	Gemmer	Warner	Firestone	6	50	Prest.	Delco	Delco	Delco	6	Cole Aero Eight 870
Columbia C	5	1895	115	32x4	Firestone	3½x4½	Cont.	6	25.35	1½—Strom.	4.75	B. and B.	Durston	Spicer	Timken	Gemmer	Stewart	Firestone	6	105	Prest.	A-L	A-L	A-K	6	Columbia C
Comet C-53	5	2350	125	33x4½	Firestone	3½x5½	Cont.	6	29.40	1½—Strom.	4.66	B. and B.	Muncie	Arvac	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Wagner	6	Comet C-53
Commonwealth 4-40	5	1495	117	32x4	Goodrich	3½x5	Lyco.	4	19.60	1—Carter	4.25	B. and B.	G-L	Detroit	Peru	C. A. S.	V. Sicklen	Stanweld	6	105	Prest.	Dyn.	Dyn.	A-K	6	Commonwealth 4-40
Craig-Hunt	5	....	103	30x3½	.....	3¾x4	Own	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Conn.	.....	.....	.....	Craig-Hunt
Crawford 20-6-40	7	3000	122½	32x4	.....	3½x5½	Cont.	6	29.40	—Strom.	.....	.....	.....	.....	Timken	Gemmer	.....	Firestone	.....	.....	.....	.....	West.	Bosch	.....	Crawford 20-6-40
Crow-Elkhart L-55-4	5	1395	117	32x3½	Firestone	3½x5	Lyco.	4	19.60	⅞—Zen.	4.25	B. and B.	Covert	Ther-H	Peru	Ditweiler	Stewart	Firestone	6	80	Exide	Dyn.	Dyn.	Conn.	6	Crow-Elkhart L-55-4
Crow-Elkhart H-55-6	5	1645	117	33x4	Firestone	3½x5	Ruten.	6	23.4	—Zen.	4.25	B. and B.	Covert	Ther-H	Peru	Ditweiler	Stewart	Firestone	6	80	Exide	Dyn.	Dyn.	Conn.	6	Crow-Elkhart H-55-6
Cunningham V-4	7	....	142	35x5	optional	3½x5	Own	8	45.00	1½—Strom.	4.08	B-L	Own	Snead	Timken	Gemmer	Warner	Firestone	6	120	Willard	Delco	Delco	Delco	6	Cunningham V-4
Daniels D	7	4850	132	34x4½	optional	3½x5½	Own	8	39.20	1½—Zen.	4.40	Own	Own	Spicer	Timken	Gemmer	Stewart	Firestone	6	145	Willard	Delco	Delco	Delco	6	Daniels D
Davis 51	5	2185	120	33x4	Goodrich	3½x4½	Cont.	6	25.35	1½—Strom.	4.75	B. and B.	Warner	Peters	Timken	Warner	Stewart	Firestone	6	80	Willard	Delco	Delco	Delco	6	Davis 51
Dixie Flyer H-S-70	5	1595	112	32x4	Fisk	3½x5	H-S	4	19.60	1—Strom.	4.72	B. and B.	G-L	Ther H	Peru	C. A. S.	V. Sicklen	Standard	6	80	Willard	Dyn.	Dyn.	Eise.	6	Dixie Flyer H-S-70
Dodge Brothers	5	1185	114	32x3½	optional	3½x4½	Own	4	24.03	1⅛—Stew.	4.16	Own	Own	Own	Own	Own	J. Man.	Kelsey	12	50	Willard	N. E.	.....	Own	12	Dodge Brothers
Dorris 6-80	7	4350	132	33x5	Goodyear	4x5	Own	6	38.40	1⅛—Strom.	3.50	Warner	Warner	Spicer	Timken	Ross	V. Sicklen	Firestone	6	130	Willard	West.	West.	Bosch	6	Dorris 6-80
Dort 15	5	1035	105½	30x3½	Goodyear	3½x5	D-Lyco	4	19.60	1—Carter	4.07	Own	Mechanics	Mechanics	Flint	Jacox	Stewart	Cleveland	6	95	U. S. L.	West.	West.	Conn.	6	Dort 15
du Pont A	5	4000	124	32x4½	Goodrich	3⅛x5½	Own	4	24.75	.....	4.45	.....	B-L	Spicer	Col.	Jacox	Stewart	Firestone	6	105	Exide	West.	West.	Eise.	6	du Pont A
Economy 6-46	5	1895	115	33x4	Goodrich	3½x4½	Cont.	6	25.35	1—Zen.	4.50	B. and B.	Durston	Norwalk	Salisbury	Ditweiler	Stewart	Firestone*	6	90	Willard	A-L	A-L	Conn.	6	Economy 6-46
Elcar 6	5	1795	116	33x4	Firestone	3½x4½	Cont.	6	25.35	1½—Strom.	4.50	B. and B.	Muncie	Peters	Salisbury	C. A. S.	Stewart	Stanweld	6	90	Willard	Delco	Delco	Delco	6	Elcar 6
Elcar 4	5	1495	116	33x4	Firestone	3½x5	Lyco.	4	19.60	1—Strom.	4.50	B. and B.	Muncie	Peters	Salisbury	C. A. S.	Stewart	Stanweld	6	90	Willard	Delco	Delco	Delco	6	Elcar 4

Engines—Ruten., Rutenber; Cont., Continental; Weid., Weidely; North., Northway; H-S., Herschell-Spillman; Lyco., Lycoming; D-Lyco., Dort-Lycoming; G. B. & S., Golden, Belknap & Swarts; T-McTeetor-McFarlan; ♯, Monson or Duesenberg; R. & V., Root & Van Dervoort. **Carburetor**—Strom., Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sunderman; Stew. Stewart; H-K., Holley-Kingston; Newc., Newcomb; Scheb., Schebler; Tillot., Tillotson; Johns., Johnston. Fuel feed vacuum except where otherwise indicated. *Pressure. ♯Gravity. **Generator and Motor**—A-L., Auto-Lite; West., Westinghouse; ♯, Westinghouse or Auto-Lite; W-L., Ward-Leonard; Dyn., Dyneto; N. E., North East; L-N., Leece-Neville; A-C., Allis-Chalmers; Split., Splitdorf; S-H., Simms-Huff; G. & D., Gray & Davis. **Ignition**—A-K., Atwater-Kent; Conn., Connecticut; Eise., Eisemann; West., Westinghouse; Will., Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splitdorf. **Gearset**—G-L., Grant-Lees; North., Northway; B-L., Brown-Lipe. **Rear Axle**—Col., Columbia; W-Weiss. Walker-Weiss; C-Timk., Cadillac-Timken; West-Mott, Weston-Mott. **Universals**—Hart., Hartford; Ther-H. Thermoid-Hardy; U. M. Co., Universal Machine Co. **Speedometer**—J-Man., Johns-Manville; V-Sicklen, Van Sicklen; A-C., Allis-Chalmers; *, 1921 Model.

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. HP.	Carburetor Size and Make	Gear Ratio	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Elgin Series K	5	1775	118	33x4	optional	3½x4½	Falls	6	23.44	1—Strom.	5.09	B. and B.	Mechanics	Mechanics	Col.	C. A. S.	V. Sicklen	Firestone	6	90	Willard	Wagner	Wagner	Wagner	6	Elgin Series K
Essex A	5	1795	108½	32x4	optional	3½x5	Own	4	18.23	1½—Own	5.09	Own	Own	Spicer	Timken	Gemmer	Stewart	Kelsey	6	105	Exide	Delco	Delco	Delco	6	Essex A
Fergus	6	....	126	32x4	.....	3½x5	.....	6	25.35	—Zen.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Bijur	Bijur	Delco	.....	Fergus
Ferris C-20	6	3675	130	32x4½	Firestone	3½x5½	Cont.	6	29.40	—Zen.	.....	B. and B.	G-L	Peters	Col.	Gemmer	Warner	Firestone	6	120	Willard	L-N	-N	L-N	6	Ferris C-20
Fiat	7	....	136	35x5	.....	.....	Own	6	.....	—Own	4.75	.....	Own	Own	Own	Own	Stewart	.....	12	60	Own	Own	Own	Marelli	.....	Fiat
Ford T	5	575	100	30x3½	optional	3¾x4	Own	4	22.50	1—H-K♯	3.63	Own	Own	Own	Own	Own	.....	.....	6	80	opt.	Own	Own	Own	6	Ford T
Franklin 9-B	5	3100	115	32x4	Goodyear	3½x4	Own	6	25.35	1—Own	4.33	B. and B.	Own	Own	Own	Own	Stewart	.....	12	60	Willard	Dyn.	.....	A-K	12	Franklin 9-B
Gardner	5	1195	112	32x3½	Goodyear	3½x5	Own	4	19.60	1—Carter	.....	B. and B.	Mechanics	Peters	W-Weiss	Ditweiler	Stewart	Jaxon	6	87	Willard	West.	West.	West.	15	Gardner
Geronimo	5	1995	122	32x4	Goodyear	3½x5	Ruten.	6	23.44	1—Strom.	4.5	B. and B.	G-L	Hart	Flint E	C. A. S.	Stewart	Firestone	6	88	Exide	Dyn.	Dyn.	Delco	6	Geronimo
Grant H-X	5	1750	116	32x4	optional	3 1/16x4½	Walker	6	22.52	1—Strom.	4.63	B. and B.	Durston	Spicer	Columbia	Jacox	V. Sicklen	Firestone	6	90	Prest.	Bijur	Bijur	A-K	6	Grant H-X
Handley-Knight	....	....	125	32x4½	.....	4½x4½	Knight	4	27.23	.....	.....	B. and B.	.....	Ther-H	Timken	.....	.....	Firestone	....	....	.....	A-L	.....	Conn.	.....	Handley-Knight
Hanson 54-A	5	2165	121	32x4	optional	3½x4½	Cont.	6	25.35	1½—Mar.	.....	B. and B.	Covert	Detroit	Timken	Gemmer	Stewart	Kelsey	6	80	Prest.	Delco	Delco	Delco	6-8	Hanson 54-A
Harroun A-A-2	5	1195	106	30x3½	Miller	3½x5½	Own	4	16.90	1—Strom.	4.00	Own	G-L	Own	Adams	Lavine	Stewart	Stanweld	6	80	Prest.	Remy	Remy	Remy	6	Harroun A-A-2
Harvard 4-20	2	850	100	30x3½	Goodrich	3½x5	H-S	4	19.60	—Zen.	.....	B. and B.	G-L	Blood	Peru	Barnes	.....	.....	6	.....	Nat'l	Dyn.	Dyn.	A-K	6-3	Harvard 4-20
Hatfield A-42	5	1695	115	32x4	Firestone	3½x5	H-S	4	16.90	1—Zen.	.....	B. and B.	G-L	Spicer	Col.	.....	Stewart	Firestone	6	.....	Willard	Dyn.	Dyn.	Conn.	6	Hatfield A-42
Haynes 48	7	3635	132	34x4½	optional	2½x5	Own	12	36.30	1½—Ray.	4.12	B. and B.	Own	Arvac	Own	Jacox	Warner	Houk	6	120	Willard	L-N	L-N	Delco	6	Haynes 48
Haynes 47	7	2935	132	34x4½	optional	3½x5	Own	6	29.40	1½—Ray.	4.77	B. and B.	Own	Arvac	Own	Jacox	Stewart	Firestone	6	120	Willard	L-N	L-N	King	6	Haynes 47
H. C. S. Special	4	2950	120	32x4½	Goodrich	3½x5½	Weid	4	21.03	—Strom.	.....	.....	.....	.....	Own	Gemmer	.....	.....	6	.....	.....	Delco	Delco	Delco	.....	H. C. S. Special
Hollier 206-B	5	1985	120	33x4	Goodrich	3½x4½	Cont.	6	25.35	1—Zen.	4.41	Fuller	Fuller	Own	Own	Warner	Stewart	Firestone	6	80	U. S. L.	West.	West.	West.	6	Hollier 206-B
Holmes	7	3350	126	34x4½	Goodyear	3½x4½	Own	6	29.40	1—Newc.	4.90	B-L	B-L	Spicer	Timken	Gemmer	V. Sicklen	Firestone	12	80	Willard	Dyn.	Dyn.	Eisc.	12	Holmes
Hudson O	7	2600	125	34x4½	optional	3½x5	Own	6	29.40	1½—Own	4.45	Own	Own	Spicer	Timken	Gemmer	Stewart	Kelsey	6	105	Exide	Delco	Delco	Delco	6	Hudson O
Huffman R	5	1995	120	32x4	Firestone	3½x4½	Cont.	6	25.35	.....	.....	B. and B.	Covert	Flexite	Salisbury	Ditweiler	Stewart	Firestone	12	90	Willard	Dyn.	Dyn.	Conn.	6	Huffman R
Hupmobile R	5	1685	112	32x4	Goodyear	3½x5½	Own	4	16.90	1 —Strom.	4.87	Own	Own	Detroit	Own	Jacox	V. Sicklen	Kelsey	6	90	Willard	West.	West.	A-K	6	Hupmobile R
Jackson 6-38	5	....	121	33x4	Goodyear	3½x4½	Cont.	6	25.35	1½—Strom.	.....	B and B.	Covert	Detroit	Salisbury	Own	Stewart	Jaxon	6	94	U. S. L.	A-L	A-L	Remy	6	Jackson 6-38
Jacquet, Royal	5	....	124	33x5	.....	4½x6	Own	4	28.90	1½—	.....	.....	.....	.....	Timken	.....	.....	.....	6	130	.....	Bijur	Bijur	.....	6	Jacquet, Royal
Jones 28	7	2750	126	32x4½	Goodrich	3½x5½	Cont.	6	29.40	1½—Ray.	4.50	B. and B.	G-L	Arvac	Stan-Par	C. A. S.	Stewart	Hayes	6	120	Prest.	A-L	A-L	A-L	6	Jones 28
Jordan F	7	2975	127	32x4½	Goodyear	3½x5½	Cont.	6	29.40	1½—Strom.	4.08	Detroit	Detroit	Spicer	Timken	Gemmer	V. Sicklen	Firestone	6	118	Willard	Delco	Delco	Delco	6	Jordan F
Jordan M	5	2650	120	32x4	Goodyear	3½x4½	Cont.	6	25.35	1½—Strom.	4.66	Detroit	Detroit	Spicer	Timken	Gemmer	V. Sicklen	Firestone	6	94	Willard	Delco	Delco	Delco	6	Jordan M
Kenworthy 4-80	7	5000	130	32x4½	optional	4 x6	Duesen.	4	25.60	1½— Strom.	.....	B-L	B-L	Ther-H	Col.	Ross.	Stewart	.....	6	140	Exide	West	West.	Bosch	6	Kenworthy 4-80
Kenworthy 6-55	5	4250	130	32x4½	optional	3½x5½	Cont.	6	29.40	—Strom.	4.10	B-Lipe	B-Lipe	Ther-H	Col.	Ross	Warner	.....	6	140	Exide	West.	West.	Bosch	6	Kenworthy 6-55
King H	7	2835	120	32x4½	optional	3x5	Own	8	28.80	1½—Ball	4.08	Detroit	Own	Ther-H	Col.	Jacox	V. Sicklen	Standard	6	120	Prest.	West.	West.	.....	6	King H
Kissel	7	3475	124	32x4½	Goodyear	3 7/8x5½	Own	6	26.75	1½—Strom.	4.25	Warner	Warner	Spicer	Own	Jacox	Stewart	Firestone	6	120	Willard	Remy	Remy	Remy	6	Kissel
Klinekar 6-55-J	5-7	2265	121	33x4	Goodyear	3½x4½	Cont.	6	25.35	1½—Ray.	4.50	B. and B.	G-L	Flexite	Standard	Wohlrab	Stewart	Firestone	6	90	Prest.	Wagner	Wagner	Conn.	6	Klinekar 6-55-J
LaFayette	7	....	132	33x5	Firestone	3½x5½	Own	8	33.80	2—Own*	.....	Own	Own	Own	Own	Own	Waltham	Firestone	6	.....	Exide	Delco	Delco	Delco	6-8	LaFayette
Leach 20-A	5	5200	126½	32x4½	Goodyear	3½x5½	Cont.	6	29.40	—Ray.	4.50	B-L	B-L	Spicer	Standard	Liberty	.....	.....	6	180	Prest.	Delco	Delco	Delco	6-8	Leach 20-A
Lexington S	5	2185	122	32x4	optional	3½x4½	Cont.	6	25.35	1½—Ray.	4.66	B. and B.	Warner	Hardy	Own	C. A. S.	Stewart	Kelsey	6	100	Willard	G-D	G-D	Conn.	6	Lexington S
Liberty 10-C	5	1985	117	32x4	Goodyear	3½x5	Own	6	23.44	1—Strom.	4.66	B. and B.	Detroit	Spicer	Timken	Gemmer	Stewart	Firestone	6	90	Willard	Wagner	Wagner	Wagner	6	Liberty 10-C
Locomobile 48	7	8900	142	35x5	optional	4½x5½	Own	6	48.60	1½—Own*	3.80	Own	Own	Own	Own	Own	Stewart	Firestone	6	140	Exide	West.	West.	Berl.	6	Locomobile 48
Lorraine	5	1575	114	32x4	Republic	3½x5	H-S	4	19.60	1—John.	4.75	B. and B.	G-L	Acme	Standard	Gemmer	Stewart	Stanweld	6	94	U. S. L.	West.	West.	West.	6	Lorraine
Maibohm B	5	1595	116	32x4	Fisk	3½x4½	Falls	6	23.44	1—Till.	4.50	B. and B.	Muncie	Flexite	Peru	Bucyrus	Stewart	Stanweld	6	94	Willard	Bijur	Bijur	A-K	6	Maibohm B
Marmon 34	7	5000	136	32x4½	optional	3½x5½	Own	6	33.75	1½—Strom.♯	3.75	Own	Own	Spicer	Own	Own	V. Sicklen	Stanweld	6	162	Willard	Delco	Delco	Delco	6	Marmon 34
Marshall K	5	1295	117	32x3½	Firestone	3½x5	Lyco.	4	19.60	1—Zen.	.....	B. and B.	G-L	Spicer	Peru	Gemmer	Stewart	Firestone	6	160	Willard	Dyn.	Dyn.	Delco	6	Marshall K
Maxwell 25	5	1155	109	30x3½	.....	3½x4½	Own	4	21.03	1—.....	.....	Own	Own	Own	Own	Own	Stewart	.....	6	87½	.....	.....	.....	.....	6	Maxwell 25
McFarland 127	7	5100	136	35x5	Goodrich	4½x6	T-McF	6	48.60	1½—Strom.	3.58	B. and B.	B-L	Spicer	Timken	Warner	Stewart	Firestone	6	120	Willard	West.	West.	Bos-W.	6	McFarland 127
Mercer Series 5	6	4950	132	32x4½	optional	3 3/4x6 3/4	Own	4	22.50	1½—Ball	3.60	Own	Own	Spicer	Own	Gemmer	Warner	Firestone	6	182	Willard	West.	West.	Eisc.	6	Mercer Series 5
Meteor K R	4	5500	129	32x4½	optional	4x6	Duesen.	4	25.60	1½—Zen.	4.41	B. and B.	Own	.....	Standard	Gemmer	Warner	.....	6	.....	Willard	Bijur	Bijur	Simms	6	Meteor K R
Metz Master 6	5	1895	120	32x4	Goodrich	3½x5	Ruten.	6	23.44	1—Strom.	4.63	B. and B.	B-L	Hart	Timken	Own	Stewart	Firestone	6	110	Willard	West.	West.	Conn.	6	Metz Master 6
Mitchell F-40	5	1750	120	33x4	.....	3½x5	Own	6	25.35	1½—Ray.	4.41	B. and B.	Own	Own	Own	Own	Stewart	Stanweld	6	90	Willard	Remy	Remy	Remy	6	Mitchell F-40
Monitor M. & Ser. 3	5	2475	121	33x4	Miller	3½x4½	Cont.	6	25.35	1—Strom.	.....	B. and B.	G-L	.....	Stan-Par.	C. A. S.	Stewart	Stanweld	6	110	Prest.	Dyn.	Dyn.	Conn.	6	Monitor M. & Ser. 3
Monroe S-9	5	1440	115	32x3½	Goodyear	3½x4½	Own	4	16.90	1½—Zen.	4.50	Own	Muncie	Universal	Own	C. A. S.	Stewart	Firestone	6	80	U. S. L.	A-L	A-L	Conn.	6	Monroe S-9
Moon 6-48	5	2385	122	32x4	Miller	3½x4½	Cont.	6	25.35	1½—Ray.	4.66	B. and B.	B-L	Spicer	Timken	Warner	Stewart	Firestone	6	110	Exide	Delco	Delco	Delco	6	Moon 6-48

Engines—Ruten., Rutenber; Cont., Continental; Weid., Weidely; North., Northway; H-S., Herschell-Spillman; Lyco , Lycoming; D-Lyco., Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McTeetor-McFarlan; ♯, Monson or Duesenberg; R. & V., Root & Van Dervoort. **Carburetor**—Strom., Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sunderman; Stew. Stewart; H-K., Holley-Kingston; Newc., Newcomb; Scheb., Schebler; Tillot., Tillotson; Johns., Johnston. Fuel feed vacuum except where otherwise indicated. *Pressure. ♯Gravity. **Generator and Motor**—A-L., Auto-Lite; West., Westinghouse; ♯, Westinghouse or Auto-Lite; W-L., Ward-Leonard; Dyn., Dyneto; N. E., North East; L-N., Leece-Neville; A-C., Allis-Chalmers; Split., Splitdorf; S-H., Simms-Huff; G. & D., Gray & Davis. **Ignition**—A-K., Atwater-Kent; Conn., Connecticut; Eise., Eisemann; West., Westinghouse; Will., Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splitdorf. **Gearset**—G-L., Grant-Lees; North., Northway; B-L., Brown-Lipe. **Rear Axle**—Col., Columbia; W-Weiss, Walker-Weiss; C-Timk., Cadillac-Timken; West-Mott, Weston-Mott. **Universals**—Hart., Hartford; Ther-H., Thermoid-Hardy; U. M. Co., Universal Machine Co. **Speedometer**—J-Man., Johns-Manville; V-Sicklen ,Van Sicklen; A-C., Allis-Chalmers.

Motor Age Monthly Passenger Car Specification Tables

These prices apply to five and seven-passenger models only.

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H.P.	Carbureter Size and Make	Gear Ratio	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Moon 6-68	7	2950	125	32x4½	Miller	3½x5¼	Cont.	6	29.40	1½—Ray.	4.45	B. and B.	B-L	Spicer	Timken	Warner	Stewart	Firestone	6	110	Exide	Delco	Delco	Delco	6	Moon 6-68
Moore 30	5	1175	108	30x3½	Firestone	3x5	Own	4	14.40	1—Mar.	.....	Detlaff.	G-L	U. P	Peru	Ditweiler	Stewart	Firestone	6	80	Willard	A-L	A-L	Conn.	6	Moore 30
Nash 681	5	1695	121	33x4	optional	3½-5½	Own	6	25.35	1½—Mar.	4.50	B. and B.	Own	Own	Own	Gemmer	Stewart	optional	6	100	Willard	Wagner	Wagner	Wagner	6	Nash 681
Nash 682	7	1875	127	34x4½	optional	3½x5½	Own	6	25.35	1½—Mar.	4.50	B. and B.	Own	Own	Own	Gemmer	Stewart	optional	6	100	Willard	Wagner	Wagner	Wagner	6	Nash 682
National Sextet BB	7	3750	130	32x4½	optional	3½x5½	Own	6	29.40	1½—Ray.	4.08	B. and B.	B-L	Arvac	Col.	Warner	Warner	Firestone	6	110	Prest.	West.	West.	Delco	6	National Sextet BB
Nelson D	5	1700	104	32x4	Goodyear	3½x4½	Own	4	15.63	1—Zen.	4.25	Own	Own	Own	Own	Own	Stewart	Kelsey	12	72	Willard	U. S. L.	U. S. L.	Bosch	12	Nelson D
Noma 1-B	4	2900	128	32x4½	Goodyear	3½x4½	Cont.	6	25.35	1½—Zen.	4.45	B. and B.	Detroit	Spicer	Timken	Lavine	Stewart	Houk	6	104	Willard	Delco	Delco	Delco	6	Noma 1-B
Oakland 34-C	5	1395	115	32x4	Goodyear	2 11/16x4½	Own	6	19.00	1—Mar.	4.50	Own	Muncie	Mechanics	Buick	Jacox	Stewart	Jaxon	6	85	Prest.	Remy	Remy	Remy	6	Oakland 34-C
Ogren 6-60	6	3750	132	33x5	Goodyear	3½x5½	Own	6	29.40	1¼—Ray.	4.10	Hoosier	Muncie	Hart	Col.	Lavine	Warner	Firestone	6	120	Willard	Bijur	Bijur	Bosch	6	Ogren 6-60
Oldsmobile 37-A	5	1450	112	32x4	Goodyear	2 11/16x4½	Own	6	18.99	1¼—John.	4.58	Own	Warner	Spicer	West. Mott	Jacox	Stewart	Jaxon	6	80	Willard	Remy	Remy	Remy	6	Oldsmobile 37-A
Oldsmobile 45-B	7	2045	122	33x4½	Goodyear	2¾x4½	Own	8	26.45	1¼—Ball.	4.91	Own	Warner	Spicer	West-Mott	Jacox	Stewart	Jaxon	6	.....	Willard	Delco	Delco	Delco	6	Oldsmobile 45-B
Olympian 45	5	1585	112	32x3½	Goodyear	3½x4½	Own	4	16.90	1 —Strom.	.....	B. and B.	Own	Detroit	Peru	Warner	Stewart	Perlman	6	.....	Willard	.....	.....	Conn.	6	Olympian 45
Overland 4	5	985	100	30x3½	Fisk	3½x4	Own	4	18.23	1—Tillot. #	4.50	Own	Own	Own	Own	Own	Stewart	Stanweld	....	80	U. S. L.	A-L	A-L	Conn.	6	Overland 4
Owen-Magnetic 60	7	7000	142	35x5	optional	4x5½	Own	6	38.40	1½—Zen.	3.87	Own	Own	Spicer	Stan-Par.	Own	Waltham	Firestone	24	.....	Exide	Own	Own	Berl.	28	Owen-Magnetic 60
Packard Twin Six	7	....	136	35x5	optional	3x5	Own	12	43.20	—Own*	4.36	Own	Own	Spicer	Own	Own	Waltham	Firestone	6	120	Willard	Bijur	Bijur	Delco	7	Packard Twin Six
Paige 6-42	5	1770	119	32x4	optional	3½x5	Own	6	23.44	1—Strom.	4.50	B. and B.	Own	Detroit	Salisbury	Jacox	Stewart	Kelsey	6	108	Willard	G. & D.	G. & D.	A-K	6	Paige 6-42
Paige 6-55	7	2400	127	33x4½	optional	3½x5¼	Cont.	6	29.40	1¼—Ray.	4.33	B. and B.	Own	Spicer	Salisbury	Jacox	Stewart	Kelsey	6	108	Willard	G. & D.	G. & D.	A-K	6	Paige 6-55
Paragon	.....	.....	122	.....	.....	3½x5½	.....	4	22.50	.....	4.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Paragon
Parenti	5	1685	123	32x4	.....	3x4½	Cameron	6	21.60	—Zen.	4.50	B. and B.	Cameron	Ther-H	Own	Own	Stewart	Jaxon	6-8	84	U. S. L.	Bijur	Bijur	Phil.	.....	Parenti
Paterson 6-50	7	2130	120	33x4	optional	3½x4½	Cont.	6	25.35	1½—Strom.	4.50	B. and B.	Durston	Hartford	Stan-Par.	Jacox	Stewart	Jaxon	6	80	Willar.l	Delco	Delco	Delco	6	Paterson 6-50
Peerless Series 6	7	3230	125	34x4½	Goodyear	3½x5	Own	8	33.80	1½—Ball.	4.90	Own	Own	Spicer	Own	Gemmer	V. Sicklen	Firestone	6	125	Willard	A-L	A-L	A-K	6	Peerless Series 6
Phianna R	5	9500	125	32x4½	U. S.	3 13/16x6	Own	4	24.70	1½—Strom.	.....	Own	Own	Own	Amer.	Own	Warner	Firestone	6	.....	Willard	W-L	W-L	Bosch	6	Phianna R
Piedmont 4-30	5	1485	116	32x3½	Firestone	3½x5	Lyc.	4	19.60	1—Carter	4.45	B. and B.	G-L	Hartford	Peru	Ditweiler	Stewart	Firestone	6	90	Willard	Delco	Dyn.	Delco	6	Piedmont 4-30
Piedmont 6-49	5	1945	122	32x4	Firestone	3½x4½	Cont.	6	25.35	1—Strom.	4.45	B. and B.	G-L	Hartford	Timken	Warner	Stewart	Firestone	6	90	Willard	Remy	Remy	Remy	6	Piedmont 6-40
Pierce-Arrow 38	7	7250	134	34x4½	Goodrich	4x5½	Own	6	38.40	—Own	3.78	Own	Own	Own	Own	Own	Waltham	Goodrich	6-8	135	.....	West.	West.	Delco	6	Pierce-Arrow 38
Pierce-Arrow 48	7	7750	142	35x5	Goodrich	4½x5½	Own	6	48.60	—Own	3.53	Own	Own	Own	Own	Own	Waltham	Goodrich	6-8	135	.....	West.	West.	Delco	6	Pierce-Arrow 48
Pilot 6-45	5	1895	120	32x4	Miller	3½x5	Teetor	6	23.44	1—Tillot.	4.90	B. and B.	Muncie	Hart	Spacke	Ditweiler	Stewart	Standard	6	100	Prest.	Delco	Delco	Delco	6	Pilot 6-45
Porter 46	7	9400	142	35x5	U. S.	4.6x6¾	Own	4	34.18	2½—Zen.	3.00	M. and E.	Own	.....	Own	Own	Stewart	Firestone	12	1?8	Prest.	West.	West.	Berl.	12	Porter 46
Premier 6-D	7	4600	126½	32x4½	Firestone	3½x5½	Own	6	27.34	1¼—John.	4.50	B. and B.	Own	Peters	Stan-Par.	Warner	Own	Firestone	6	120	Willard	Delco	Delco	Delco	6	Premier 6-D
Ranger	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Ranger
Reo T-6	5	1750	120	33x4	U. S.	3 7/16x5	Own	6	24.30	1½—Ray.	4.66	Own	Own	Own	Own	Own	Stewart	Firestone	6	108	Willard	N. E.	N. E.	N. E.	6	Reo T-6
ReVere C	7	4650	131	32x4½	optional	4½x6	Duesenb'g	4	30.63	1⅞—Strom.	3.44	B-L	B-L	Spicer	Standard	Gemmer	Stewart	Houk	6	120	Willard	West.	West.	Bosch	6	ReVere C
Roamer C-6-54	7	3150	128	32x4½	Goodyear	3½x5½	Cont.	6	29.40	1½—Strom.	.....	B. and B.	G-L	Ther-H	Stan-Par.	Jacox	Warner	Stanweld	6	90	Col.	Bijur	Bijur	Bosch	6	Roamer C-6-54
R & V Knight J	7	3350	127	32x4½	optional	3½x4½	Own	6	29.40	1½—Strom	4.90	B. and B.	B-L	Spicer	Timken	Jacox	Stewart	Firestone	6	117	Willard	Wagner	Wagner	Wagner	6	R & V Knight J
R & V Knight R	5	2150	115	32x4	optional	3½x5	Own	4	22.50	1½—Strom	4.75	B. and B.	B-L	Spicer	Salisbury	Jacox	Stewart	Firestone	6	117	Willard	Wagner	Wagner	Wagner	6	R & V Knight R
Saxon	5	1785	112	32x4	.....	3½x5	Own	4	18.23	1½—Strom.	4.75	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	Prest.	Wagner	Wagner	Wagner	6	Saxon
Sayers Six	5	2095	118	33x4	Goodyear	3½x4½	Cont.	6	25.35	1—Strom.	.....	B. and B.	G-L	Arvac	Stan-Par.	Warner	Stewart	Firestone	6	80	Willard	Delco	Delco	Delco	6	Sayers Six
Scripps-Booth B-39	5	1425	115	32x4	Goodyear	2 7/16x4½	North.	6	18.99	1—Mar.	4.50	North.	Warner	Peters	West-Mott	Jacox	Stewart	Kelsey	6	85	Prest.	Remy	Remy	Remy	6	Scripps-Booth B-39
Seneca L	5	1185	108	30x3½	Miller	3½x4½	Le Roi	4	15.63	1—Scheb.	4.75	B. and B.	Warner	.....	Peru	Ditweiler	Stewart	Jackson	6	88	Prest.	A-C	A-C	Conn.	6	Seneca L
Severin H	5	2550	122½	32x4½	Miller	3½x5½	Cont.	6	29.40	—Strom.	4.50	B. and B.	Muncie	Peters	Salisbury	Lavine	Stewart	Firestone	6	110	Camp.	Wagner	Wagner	Wagner	6	Severin H
S. G. V	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	S. G. V.
Shaw	7	5000	136	33x5	Firestone	4½x6	Roch.	4	28.90	—Strom.	.....	B-L	B-L	.....	Timken	Jacox	Warner	Firestone	.....	.....	.....	West.	West.	Bosch	.....	Shaw
Singer 20	7	6500	138	33x5	Goodyear	2½x5	Weid.	12	39.68	1½—Strom.	3.77	Covert	Covert	Spicer	Timken	Ross	Stewart	Own	6	162	Willard	West.	West.	Phil.	6	Singer 20
Skelton	5	1295	112	32x3½	optional	3½x5	Lycoming	4	19.60	1—Carter	4.25	B. and B.	Muncie	Universal	Peru	C. A. S.	Stewart	Stanweld	6	85	Prest.	West.	West.	Conn.	6	Skelton
Spacke S-20	2	345	90	28x3	U. S.	3½x3.67	Own	2	9.80	1—Carter #	5.09	Own	Own	.....	....	Own	Own	.....	.....	.....	.....	.....	.....	A-K	.....	Spacke S-20
Standard 8-I	7	....	127	34x4½	optional	3½x5	Own	8	33.80	1¼—Zen.	4.45	B. and B.	G-L	Arvac	Timken	Gemmer	Stewart	Firestone	6	160	Willard	West.	West.	Opt.	6	Standard 8-I
Stanwood	5	2050	118	33x4	Firestone	3½x4½	Cont.	6	.....	1½—Strom.	4.50	B. and B.	G-L	Peters	Stan-Par.	Gemmer	.....	Stanweld	6	.....	Willard	West.	West.	A-K	.....	Stanwood

Engines—Ruten., Rutenber; Cont., Continental; Weid., Weidely; North., Northway; H-S., Herschell-Spillman; Lyco., Lycoming; D-Lyco., Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McTeetor-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. **Carburetor**—Strom., Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sunderman; Stew. Stewart; H-K., Holley-Kingston; Newc., Newcomb; Scheb., Schebler; Tillot., Tillotson; Johns., Johnston. Fuel feed vacuum except where otherwise indicated. *Pressure. #Gravity. **Generator and Motor**—A-L., Auto-Lite; West., Westinghouse; #, Westinghouse or Auto-Lite; W-L., Ward-Leonard; Dyn., Dyneto; N. E., North East; L-N., Leece-Neville; A-C., Allis-Chalmers; Split., Splitdorf; S-H. Simms-Huff; G. & D., Gray & Davis. **Ignition**—A-K., Atwater-Kent; Conn., Connecticut; Eise., Eisemann; West., Westinghouse; Will., Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splitdorf. **Gearset**—G-L., Grant-Lees; North., Northway; B-L., Brown-Lipe. **Rear Axle**—Col. Columbia; W-Weiss Walker-Weiss; C-Timk. Cadillac-Timken; West-Mott Weston-Mott. **Universals**—Hart. Hartford; Ther-H. Thermoid-Hardy; U. M. Co. Universal Machine Co. **Speedometer**—J-Man. Johns-Manville; V-Sicklen Van Sicklen; A-C. Allis-Chalmers.

STEAM CARS

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. HP.	Carburetor Size and Make	Gear Ratio	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Stearns 8 SKL4	5	2450	125	34x4½	Goodrich	3½x5½	Own	4	22.50	1½—Scheb.	4.50	Own	Own	Spicer	Own	Own	V. Sicklen	Firestone	12	65	Willard	West.	West.	A-K	12	Stearns SKL-4
Stephens 80	6	2400	122	33x4½	Fisk	3½x4½	R. & V	6	25.35	1½—Tillot.	4.75	B. and B.	Mechanics	Mechanics	Stan-Par	C. A. S.	Stewart	Stanweld	6-8	116	U. S. L.	A-L	A-L	Conn.	6	Stephens 80
Stevens-Duryea	7	7000	138	35x5	optional	4½x5½	Own	6	47.25	—Strom.	.....	Own	Own	Own	Own	C. A. S.	Waltham	Firestone	6	.....	.....	West.	West.	Berl.	6	Stevens-Duryea
Studebaker E-J	5	1485	112	32x4	.....	3½x4½	Own	6	23.44	—Strom.	4.55	Own	Own	.....	Own	Own	Stewart	Kelsey	6	80	Willard	Wagner	Wagner	Remy	6	Studebaker E-J
Studebaker E-G	7	2250	126	33x4½	Goodyear	3½x5	Own	6	36.04	1½—Ball.	3.70	Own	Own	Spicer	Own	Own	V. Sicklen	Kelsey	6	80	Willard	Wagner	Wagner	Wagner	6	Studebaker E-G
Studebaker E-H	5	1785	119	32x4	.....	3½x5	Own	6	29.40	1½—Strom.	4.33	Own	Own	Spicer	Own	Own	V. Sicklen	Kelsey	6	80	Willard	Wagner	Wagner	Wagner	6	Studebaker E-H
Stutz H	6	3600	130	32x4½	optional	4½x6	Own	4	30.63	1½—Strom.	3.50	Own	Own	Own	Own	Gemmer	Warner	.....	6	130	Willard	Remy	Remy	Deleo	6	Stutz H
Templar A-445	5	2885	118	32x4	optional	3½x5½	Own	4	18.23	1½—Strom.*	4.40	B. and B.	Detroit	Hardy	Own	C. A. S.	Warner	Firestone	6	100	Prest.	Bijur	Bijur	Simms	6	Templar A-445
Texan B-38	5	1495	115	33x4	Southland	3½x5	Lyc.	4	19.60	—Car.	.....	B. and B.	G-L	Detroit	Peru	C. A. S.	Stewart	Firestone	6	80	Exide	Bijur	Bijur	Conn.	6	Texan B-38
Tulsa E	5	1550	117½	33x4	Firestone	5x3½	H-S	4	19.60	1½—Zen.	4.50	B. and B.	Muncie	.....	Salisbury	C. A. S.	Stewart	Stanweld	6	80	Exide	Dyn.	Dyn.	Conn.	6	Tulsa E
Velie 48	5	1885	115	32x4	Goodyear	3½x4½	Cont.	6	25.35	1½—Ray.	4.66	B. and B.	Durston	Arvac	Timken	Gemmer	V. Sicklen	Firestone	6	120	Willard	Bijur	Bijur	A-K	6	Velie 48
Velie 34	5	1585	112	32x3½	optional	3½x4½	Falls	6	21.44	—Ray.	4.60	B. and B.	Durston	Arvac	Col.	Gemmer	V. Sicklen	Firestone	6	100	Willard	West.	West.	A-K	6	Velie 34
Vogue 6-55	5	2285	124	32x4	Goodrich	3½x5	H-S	6	25.35	—Scheb.	4.50	B. and B.	Warner	Norwalk	Salisbury	Ditweiler	Stewart	Firestone	6	108	Willard	A-L	A-L	Conn.	6	Vogue 6-55
Vogue 6-66	5	2485	124	33x4½	Goodrich	3½x5½	Cont.	6	29.40	—Scheb.	4.50	B. and B.	Warner	Norwalk	Salisbury	Ditweiler	Stewart	Firestone	6	108	Willard	A-L	A-L	Conn.	6	Vogue 6-66
Wasp	4	6500	132	33x5	Firestone	4½x5½	Wis.	4	36.10	1½—Strom.	3.10	.....	Covert	Spicer	Timken	Gemmer	Stewart	Firestone	6	145	Exide	West.	West.	Bosch	6	Wasp
Westcott C-38	5	2690	118	33x4	Firestone	3½x4½	Cont.	6	25.35	1½—Ray.	5.09	B. and B.	Warner	Peters	Timken	Gemmer	V. Sicklen	Firestone	6	117	Willard	Delco	Delco	Delco	6	Westcott C-38
Westcott C-48	7	3190	125	32x4½	Firestone	3½x5½	Cont.	6	29.40	1½—Ray.	4.45	B. and B.	B-L	Peters	Timken	Gemmer	V. Sicklen	Firestone	6	117	Willard	Delco	Delco	Delco	6	Westcott C-48
Willys-Knight 20	5	2250	118	33x4	Fisk	3½x4½	Own	4	21.03	1—Tillot.*	5.00	Own	Own	Ther-H.	Own	Own	Stewart	Stanweid	...	170	U. S. L.	A-L	A-L	Conn.	6	Willys-Knight 20
Winther 61	5	....	120	33x4	Goodyear	3½x5	H-S	6	25.35	1½—Strom.	4.50	Warner	Warner	Peters	Spacke	Lavine	Stewart	Firestone	6	127	Willard	West.	West.	West.	6	Winther 61
Winton 25	7	4600	132	35x5	optional	3½x5½	Own	6	33.75	1½—Strom.	4.90	.....	.....	.....	.....	.....	Warner	Firestone	6	120	Willard	Bijur	Bijur	Bosch	6	Winton 25
Stanley 735-B	7	4875	130	34x4½	Optional	4-5	Own	2	20.00	none	none	none	none	Own	.....	.....	V. Sicklen	Firestone	6	116	Willard	Remy	None	None	6	Stanley 735-B

Engines—Ruten., Ruteaber; Cont., Continental; Weid., Weidely; North., Northway; H-S., Herschell-Spillman; Lyco., Lycoming; D-Lyco., Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McTeetor-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. **Carburetor**—Strom., Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sunderman; Stew. Stewart; H-K, Holley-Kingston; Newc., Newcomb; Scheb., Schebler; Tillot, Tillotson; Johns., Johnston. Fuel feed vacuum except where otherwise indicated. *Pressure. #Gravity. **Generator and Motor**—A-L, Auto-Lite; West., Westinghouse; #, Westinghouse or Auto-Lite; W-L, Ward-Leonard; Dyn., Dyneto; N. E., North East; L-N., Leece-Neville; A-C., Allis-Chalmers; Split., Splitdorf; S-H., Simms-Huff; G. & D., Gray & Davis. **Ignition**—A-K, Atwater-Kent; Conn., Connecticut; Else., Eisemann; West., Westinghouse; Will, Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splitdorf. **Gearset**—G-L., Grant-Lees; North., Northway; B-L., Brown-Lipe. **Rear Axle**—Col., Columbia; W-Weiss, Walker-Weiss; C-Timk., Cadillac-Timken; West-Mott, Weston-Mott. **Universals**—Hart., Hartford; Ther-H., Thermoid-Hardy; U. M. Co., Universal Machine Co. **Speedometer**—J-Man., Johns-Manville; V-Sicklen, Van Sicklen; A-C., Allis-Chalmers

The Used-Car Business In The South

(Concluded from page 14.)

as a result, this branch of the automotive industry is now a fixed factor in the business life of this section, and an important one. We get a number of cars we could repaint and clean and sell for considerably less than we do, but we discovered some time ago that this doesn't pay. In fact, virtually all the used-car dealers in New Orleans and other parts of the South realize that low price is not the supreme drawing card when it comes to the sale of used automobiles—or new ones either, for that matter.

Service Above All Else

"I do not mean by this that the price can be ignored by any dealer, but the dealer who does not make price a secondary consideration and who does not let service to his customer rank above everything else, is not building his businessness on a sound foundation. The people have been educated to a degree where they will not be hoodwinked by unscrupulous dealers as they were in the early days of the automobile business, and let me add that this applies to the used-car department more strongly than to any other branch of the selling of automotive vehicles.

Buyers Are Wise Now

"The people realize now that in buying a car which has been superficially overhauled and made to look 'pretty,' they are making a poor investment; they are demanding that the car be really rebuilt and capable of service commensurate with the price they pay for it. Realization of this by the used-car dealers is what has put this branch of automobile selling on a comparatively high plane and on a firm basis in the South within the past two or three years. Associations of automobile dealers in the various towns also have helped to raise the standard, and to let the used-car dealer know that if he expects to establish a permanent business for himself, he must deliver just what he represents himself to be selling, and nothing else.

Good Business Policy

"Take the matter of pistons—just as an example. It happens in a great many instances that in taking a car in we find it necessary, according to our way of thinking, to replace the pistons. Not that this is actually needed to 'make the car run,' for it might run ten miles without showing any defects, and again it might run 500 miles, but in the end if we did not replace or rebuild the pistons, we should have a dissatisfied customer on our hands. This is plain business sense and not philanthropy. As a matter of fact, none of the used-car dealers I have ever met take pains with the overhauling of their cars from philanthropic motives, but because in the long run care and honest work pay best, that is, if the dealer intends to remain in the used-car business.

From the Four Winds

Glimpses at the World of Motordom

COMING MOTOR EVENTS

Automobile Shows

Des Moines, Ia.	Annual Fall Show	Aug. 25-Sept. 6
Toronto, Exhibition City	National Automobile Show	Aug. 28-Sept. 11
Milwaukee	Annual Fall Automobile Show	Aug. 30-Sept. 4
Sacramento, Cal.	Annual Show	Sept. 4-12
Indianapolis	Fall Automobile Show	Sept. 6-11
Cincinnati	Annual Passenger Car Show	Sept. 18-25
Buffalo	Closed Car Show	Sept. 27-Oct. 2
Minneapolis	Closed Car Show	Oct. 5-9
Northampton, Mass.	Annual Automobile Show	Oct. 6-8
Jersey City, N. J.	Annual Automobile Show	Nov. 1-6
New York	Automobile Salon	Nov. 14-21
Chicago	Automotive Equipment Show	Nov. 15-20
New York	National Passenger Car Show	Jan. 8-15, 1921
Chicago	National Passenger Car Show	Jan. 29-Feb. 4, 1921
Minneapolis	Winter Show	Feb. 5-12, 1921

Tractor Shows

Los Angeles, Cal.	National Tractor and Implement Show of the West	Sept. 20-26
Columbus, O.	National Tractor Show	Feb. 6-12, 1921

Foreign Shows

London	Commercial Vehicles, Exhibition, Olympia	October
London	Passenger Car Show, Olympia	November

Races

Hornell, N. Y.	Dirt Track	Sept. 6
Uniontown, Pa.	Speedway Race	Sept. 6
Syracuse, N. Y.	Dirt Track	Sept. 17-18
Allentown, Pa.	Dirt Track	Sept. 25
Los Angeles, Cal.	Speedway Race	Nov. 25

Tours

Milwaukee, Wis.	Annual Fall Automobile Show	Aug. 30-Sept. 4
Detroit	Good Roads, Assn. Tour	July 14-20

Conventions

Cincinnati	Ohio Automobile Trade Assn. Fourth Annual Convention	Dec. 8-10
Atlantic City	National Implement and Vehicle Assn. Twenty-seventh Annual Convention	Oct. 20, 21, 22

BUSINESS NOTES

C. R. Norton, formerly general distribution manager of the Packard Motor Car Co., has been appointed Pacific coast manager for Hare's Motors, with Charles Kingsley as his special representative.

The Milwaukee Scripps-Booth Co., Milwaukee, Wis., has been incorporated for $25,000 by James E. Van Etta, F. J. Kasper and G. W. Kollosson, to act as distributor and dealer in the Scripps-Booth.

The Fountaine-Lipman Motor Co., of Milwaukee, Wis., recently appointed state distributor of the Stutz, is incorporating its business and has opened sales and service headquarters at 622-624 Wells street.

The A. E. Martin Foundry Co., 705 Park St., Milwaukee, Wis., one of the largest makers in America of cylinder and piston castings exclusively, has completed a large works addition and is breaking ground for further extensions, consisting of a foundry addition and a new coreroom. This will bring up the output to from 35 to 40 tons a day, compared with the present capacity of 25 to 30 tons daily. A specialty is made of air-cooled cylinders.

The Boulet Motor Truck Company, operating the Boulet Transfer System in New Orleans, has taken the Southern agency for the Gary truck, with C. E. Patton in charge of distribution. The Gary parts depot has been moved from Shreveport, La., to New Orleans.

The Lafayette Philadelphia Co., Philadelphia, has been appointed distributors of the Lafayette in that city. The company was organized by E. I. Hyneman and R. H. Drayton. G. H. Judd, formerly with the Philadelphia Pierce-Arrow distributor, will be general sales manager.

Herbert A. Small, until recently assistant export manager of the Republic Motor Truck Co., Alma, Mich., has been made manager of the export division of the Traffic Motor Truck Corp., St. Louis.

PERSONALS

W. R. DeVoe, for several years connected with the sales department of Briscoe Motors Corp., has associated himself with W. E. Miller, as DeVoe & Miller, handling Briscoe distribution for western and southern Michigan and northern Indiana. Plans for an elaborate sales and service station have been outlined and work on the construction will begin shortly. J. R. Findleter, general sales manager has named Neil Cowham as successor to DeVoe in the Briscoe sales organization.

A. J. Banta, in charge of Maxwell-Chalmers distribution in Chicago, has resigned and has been succeeded by G. E. Stebbins, for some time connected with the factory organization as assistant director of sales.

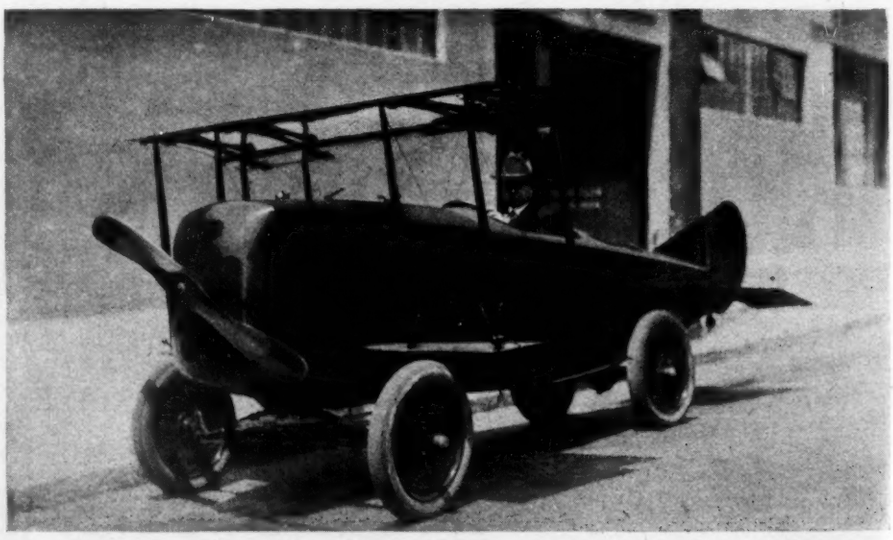
M. L. Pulford, for seven years connected with the engineering department of Commerce Motor Car Co., has been appointed service engineer in charge of the service department.

J. Elden Shaw, formerly sales manager of the Savage Tire Sales Co., Des Moines, Iowa, has been appointed district manager of the Pacific coast business of the Standard Tire Co.

Guy H. Peasley, lately distribution manager of the Olds Motor Works, Lansing, Mich., has been promoted to the position of assistant sales manager, succeeding C. F. Batchelder, who has been made general manager of the H. J. Lamar Co., Inc., Oldsmobile distributors at Macon, Ga.

Gramm-Bernstein Motor Truck Co., of Lima, Ohio, has increased its capital from $1,000,000 to $5,000,000. The entire amount will be issued as common stock. A stock dividend of 50 per cent has been declared out of its surplus earnings to common stockholders of record of July 31. Employes will be given opportunity to purchase the new stock.

NOVEL ADVERTISING STUNT



An airplane built by Kresteller & Steward of San Francisco on a Ford chassis and provided with a propeller, which can be operated by the engine, is used for advertising purposes. It is equipped with port and starboard lights, rudder, used as a direction indicator, and elevators operated by the controlling lever. When the car is brought to a stop the elevators are automatically lowered in the same position as on a plane when descending